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Some Phases of the Illumination of Interiors.[1]

[From a Paper read and a Demonstration made by MR. PRESTON S. MILLAR, Joint Session, American Gas Institute and Illuminating Engineering Society.]

* * * * It is a peculiarity of illuminating engineering that its demands are for the highest technical knowledge and skill applied in the common walks of life, and that success or failure affects closely the people in their ordinary occupations, hence the most technical discussion is likely to have a practical application of interest to the man in the street. It is the purpose of this presentation[2] to indicate in a non-technical manner some features of the illumination of interiors which have been studied as a basis for practice.

1. Slightly abridged.—EDS.

2. For the lecture upon which these notes are based miniature rooms were constructed, 4 by 4 feet and 3½ feet high. Wall decorations, as well as lighting equipments, could be altered readily. With one or two exceptions lamps were so operated as to produce 64 lumens in each room.

If a room be illuminated by a bare lamp (Fig. 1, right), the results are unsatisfactory. The walls receive most of the light and the portions of the room in which the light is more likely to be utilized are inadequately illuminated. The light source is unattractive, and, when within the field of vision, is annoying, if not injurious to the eyesight. This latter effect, included under the name of glare, is very noticeable in the illustration, where the lamp is at the center of the field of vision, and the effect is exaggerated beyond that experienced by occupants of the room.

Room 3. Room 2. Room 1.

Fig. 1.—Showing Importance of Shading Lamp.

If the lamp be shielded from view (Fig. 1 left) conditions are improved, and much of the discomfort and annoyance disappears. While the distribution of light volume on surfaces seen within the room is not changed materially, everything is seen more distinctly. Observe, for example, the vertical stripes upon the wallpaper. Beginning near the floor, trace a vertical stripe in room 1. As one's gaze approaches the vicinity of the lamp, it is difficult to see the stripe, and when level with the lamp, the stripe disappears entirely. In room 3 (to the left) in which the lamp is shielded from the eye, the corresponding stripe may be distinguished when looking just past the lamp and screen.

An important function of a reflector is to shield the lamp from view, by interposing between it and the eye an opaque or translucent medium. This is accomplished in room 2 (Fig. 1, middle); but a reflector should fulfil other equally useful purposes. It may also be made to direct a portion of the light where it can be utilized to best advantage. Much study has been given to this aspect of the problem, and the performance of any type of reflector may be ascertained by photometric tests of light distribution which practically all manufacturers are prepared to supply with their wares. In no other branches of illumination have such great strides been made, in the past 10 years, as in the design of reflectors and lighting auxiliaries.

The bare lamp distributes but a small proportion of the light downward. In room 2 (Fig. 2) a reflector is used which re-directs downward a good portion of the light, illuminating the card below much more brightly than would a bare lamp. In room 3, this redirection of light is effected in such a way as to concentrate it direct-

Room 3. Room 2. Room 1.

Fig. 2.—Showing Variety of Light Distributions which may be Obtained by use of Ordinary Reflectors.

ly below the lamp, illuminating the card to a brighness about twice of the card in room 2, which was considerably brighter than that in the room where no reflector was used.

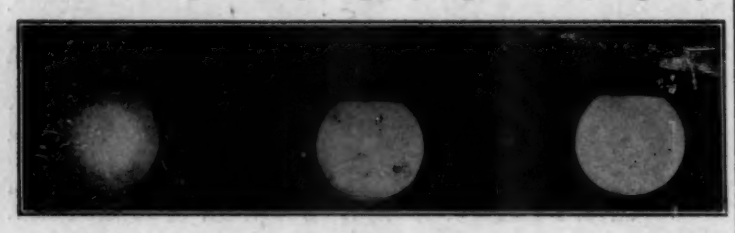
In room 1, as now equipped, a reflector has been designed, without regard to optical laws, and, while looking like a prismatic reflector, has few of the qualities which characterize such glassware. It accomplishes little in the way of re-direction of light, while affording ineffectual protection for the eyes against brightness of the filament. It absorbs a certain amount of light without any adequate return in improvement.

The three rooms illustrate the range of practicable accomplishment in the employment of reflectors (omitting opaque reflectors) which are suitable for employment under such conditions. In 1, general distribution of the light throughout the room; 2, effective redirection of much of the light downward, largely increasing the intensity on the table plane, and illuminating the walls and ceiling brightly enough to avoid dimness; in 3, concentration beneath the lamp is very marked, effected by taking from the walls, and from the table plane near the walls, a portion of the light which falls upon them in 2. The relative intensities of light distributed downward may be judged from the floor brightness.

The correct design of a reflector to accomplish a given purpose involves the application of well-known optical laws. With prismatic glass and mirror types a wide variety of distribution may be obtained. With opal or phosphate glasses, as in room 2, the possibilities of high concentration are more limited, though, with this one exception, these too may be designed to produce practically any distribution.

In achieving the particular distribution which characterizes a given reflector, it is important that the light source be correctly located within the reflector. A poorly made shadeholder, or an improper lamp, distorts the distribution and usually detracts from the appearance and usefulness of the unit. In reflectors, globes and other glass lighting auxiliaries, the degree of optical density is important, affecting both the performance and appearance. In the now common form of display street lighting, using clusters of tungsten lamps in globes, very displeasing effects are sometimes encountered, due to the non-uniformity of the globes or to insufficient density, which makes the location of the lamp apparent, instead of rendering the whole surface of the globe equally bright. Much of the lighting glassware in use in residences a few years ago, or even to-day, is of etched or frosted, crystal glass, which serves chiefly to give the fixture a finished appearance. It neither directs sufficient light usefully to make it efficient nor conceals the light source sufficiently to make it attractive or of value in protecting the eyes.

Fig. 3 shows a globe of crystal glass, roughed inside; a light opal



Light. Medium. Dense.

Fig. 3.—Showing Improved Appearance when Glassware is Dense Enough to Conceal Lamp.

globe; and a denser opal globe. The last presents a better appearance without involving serious sacrifices otherwise. The light absorptions of these balls are respectively 6 per cent., 13 per cent. and 22 per cent.

When employed in the miniature rooms (Fig. 2) the relative light intensities throughout the table plane averaged:

Type.	Per Cent.
Frosted ball	100
Light opal ball	106
Dense opal ball	95

Practically all ordinary requirements in interior illumination may be filled by lighting auxiliaries selected from those now upon the market, most of the reflectors and globes which pretend to be efficient accomplishing their purpose admirably. In fact so carefully has this been studied, than an inefficient reflector cannot be successful unless it has some compensating advantage which renders it superior for some purposes, in spite of its inefficiency. I recently compared the standard types of reflectors which were upon the market 10 years ago, with types now available. In efficiency, the improvement was very marked. Absorptions of 10 to 20 per cent. now rule, where 10 years ago absorptions of 25 to 40 per cent. were typical for reflectors of substantially similar light distribution characteristics. As in efficiency, so it is in appearance. Most of the reflectors of 10 years ago were opaque, and few pleasing to the eye. To day, even where efficiency in light re-direction is the chief aim, pleasing appearance is the order. In lighting auxiliaries, in which decorative effect is the chief object, a wide variety is available. Unfortunately, however, such auxiliaries are inefficient to an unnecessary extent.

The influence of room decoration upon the volume of light required to illuminate it properly is very marked. Considering the case of a bare lamp, employed to illuminate rooms having light, medium and dark walls respectively, we may note a number of interesting effects (Fig. 4). In the first place, the card on table in room

Room 3. Room 2. Room 1.

Fig. 4.—Showing Appearance with Various Wall Decorations.

3 appears brighter than the cards in other rooms. It cannot be brighter, in that it receives light from the lamp and the ceiling only, while the card in room 1 receives light from the corresponding light sources and ceiling which is enhanced considerably by light reflected from the walls. The card in room 1 is actually 30 per cent. brighter than the card in room 3. That it does not so appear is an example of the effect of contrast, a very important fundamental. A corresponding comparison may be made by observing the upper part of the wall in each room, the white paper appearing brighter in room 3, though actually not so bright as the white surfaces in 1 and 2.

In room 1, parts of the furniture but slightly illuminated (as legs of the table) stand out distinctly, being silhouetted against the light wall. In room 3, the contrast between the rear wall and the dimly lighted portions of the furniture is so small that it is difficult to see them.

The glare from the exposed light source is more serious in room 3, due to the contrast between the light source and the walls. Shadows of the furniture against the walls are very prominent by contrast in room 1, despite the fact that the shaded areas are more brightly illuminated by light generally diffused within the room. In considering this photograph, it should be remembered that no light-directing auxiliary is employed, and that, therefore, a larger proportion of the light falls upon the walls than good practice would dictate, if we except the darker room. In most installations it is desirable primarily to secure proper illumination of lower part of room, where the light is utilized, the other requirements being that ceiling and walls shall be illuminated sufficiently to make the effect pleasing. When reflectors are used, the lighting effect of ceiling and wall decorations is reduced greatly, if the reflectors are concentrating and reduced slightly, and if they distribute the light rather broadly, about lower part of the room. Brightness of walls is important, affecting ocular comfort probably more seriously than the illumination of the table plane. Generalizing, it is probably best to avoid extremes of wall decoration, whether light or dark. If of high reflecting power, it is important to direct most of the light that the amount falling upon the walls will not render them so bright as to be trying to the eyes. The illuminating engineer cannot control wall decorations, but he can control the light produced within the room and direct to secure the best effects.

In the next photograph a reflector which directs the light down-

Room 3. Room 2. Room 1.

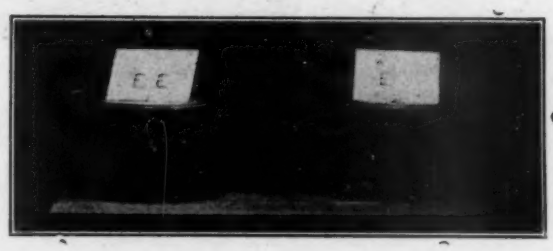
Fig. 5.—Showing Appearance with Various Wall Decorations.

ward is shown. This lessens the brightness of the upper part of the walls, the change being most apparent in room 1, where, due to the relatively high reflecting power of the wall paper, the wall was brightest in the last photograph. The lower portions of the walls are somewhat brighter than where bare lamps were employed. Due to the better lighting of the floor, the lower portion of table and chairs, which with the bare lamps could hardly be seen, are now slightly illuminated. With this installation the effect of the ceiling and walls is lessened, because less light falls upon them. That is to say, when a suitable reflector is employed, the table plane illumination intensity is more nearly independent of reflection from ceiling and walls and instead of relying upon the latter for assistance in producing useful illumination, the problem is to render the walls bright enough to produce a cheerful appearance.

It has been shown above that the ceiling and wall decorations, when light in tone, may be of material assistance in increasing the illumination intensity on the table plane. It may be argued, as the corollary of this, that, when the walls are dark and incapable of augmenting the table plane illumination, the use of reflectors for that purpose is more important.

I have discussed the effect of glare due to the presence of a bright light source within the field of vision. This effect is almost, if not quite, as disturbing, if an image of the lamp is seen in a mirror. In that event, the effect would be due, not to the presence of the light source, but to specular reflection of the light from the mirrored surface. It is unfortunate that most artificial surfaces which we are likely to view are sufficiently glossy or polished to partake in some measure of the qualities of a mirror, and reflect light specularly. Surfaces which are mat and free from gloss, diffuse the light so generally that the specular reflection is immaterial. But in most book and magazine paper there is considerable specular reflection, which characteristic is responsible for much of the difficulty in utilitarian lighting.

In the demonstration cards (Fig. 6) the paper and letter on the

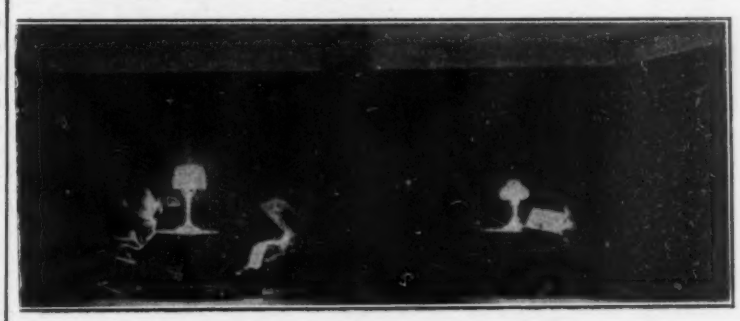


Viewed from Direction in which Glare is not Appa ent. Viewed from Direction in which Glare is Apparent.

Fig. 6.—Showing Glare due to Specular Reflection from Glossy Surface.

right half of each have glossy surfaces, while those on the left have diffusing surfaces, almost totally free from specular reflection. On the right half one may see, when in line with the direction of the reflection, one or a number of distorted images, of the light source, much as though he were viewing it in a very imperfect mirror. On the left it is noted only that the surface is illuminated and no trace of an image of the light source is seen. From all positions the letter on the left half of the card may be seen. From one direction (right photograph), that upon the right half of the card can be seen only with difficulty, if at all, because of the glare.

No small part of the dissatisfaction with illumination installations is due to this glare from observed surfaces, and no small part of trouble with eyes is traceable to the same source. There are three remedies: One, to eliminate glossy surfaces, particularly is this important in schoolbooks; and it is gratifying to know that serious efforts are being made to regulate this. The second remedy is to reduce the brightness of light sources by passing the light through a diffusing medium of large area, or by reflecting it from a large diffusing surface, in order that, when specular reflection from an observed surface is encountered, the brightness of the light reflected may be so low as to minimize the difficulty. The third remedy is to so locate light sources, or to so locate the illuminated surfaces and adjust the position in working or reading, that the light is not reflected specularly toward the eyes. All three of these remedies should be kept in mind and applied where practicable, and any one, or a combination of the three, can be made effective in reducing the trouble. The growing appreciation of the importance of this element of illuminating engineering work has been the distinguishing feature of the past 2 years in the illumination field.



Good Reading Posture. Very Undesirable Reading Posture. Undesirable Reading Posture.

Fig. 7.—Showing Manner in which a Table Lamp may be Used.

The oil lamp has been the standard of comparison for artificial illumination, and even to-day it is traditional among oculists that no other artificial illuminant yields a light so free from detriment to the eyesight. It is, therefore, of interest to note some of the conditions under which the oil lamp has been used. Being essentially a small illuminant, self-contained and portable, it was natural that it should be placed close to the object viewed. This entailed locating it more or less on a level with the eyes, and so near to the observer that shielding the former became a matter of natural course, and this is the reason for the development of the oil lamp shade. Given, a small illuminant, shaded, there was no condition under which visual difficulties could be experienced unless attempting to read with the book in the illuminated zone near the lamp base, with the reader facing the lamp (room 1). Under these conditions, glare, due to specular reflection from the paper, might be detrimental, but it would be so immediately apparent that instinctively the reader would shift his position, or the lamp, to avoid it. With light from this single light-source incident upon the page from a direction which would not give serious glare from the paper, and with the flame shielded from the eyes, the conditions for reading or work were comparatively good. At the same time, the old oil lamp was well adapted to the illumination of a book by light from over the reader's shoulder (room 3), one of the best positions for reading. It was in the comparative freedom from misuse of the oil lamp, and the conditions which its employment made natural, that the relative freedom from harmful effect was found, if such freedom did exist under those conditions. No matter how favorable conditions may be, it is difficult to prevent a certain amount of carelessness or perversity in the use of the light (room 2). Whether carelessness induces Mrs. Lux to read with her page dimly illuminated by light from the ceiling and wall, while facing the light, is open to question. Perhaps she may feel that she is more attractive with the light upon her face.

Wall brackets may be used with good effect if equipped discreetly, but they are of value chiefly in providing local illumination. It is very difficult to light a room solely from brackets (Fig. 8). The light

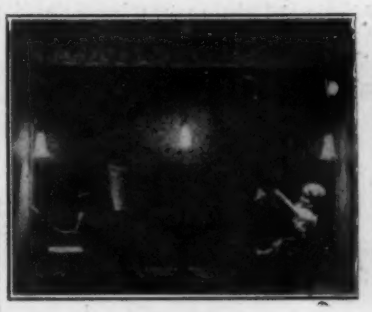


Fig. 8.—Illumination from Wall Brackets Alone.

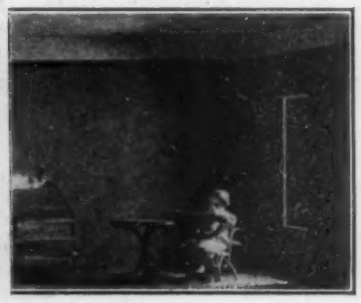


Fig. 9.—Daylight Illumination.

cannot be distributed satisfactorily without the light sources within the range of vision. Brackets find best application in rooms where the main illumination is provided otherwise and the brackets equipped with decorative shades, serving purposes of ornament rather than utility.

Daylight, being that under which the eye has been evolved, may be expected to possess the qualities for which the eye is best adapted. Neglecting other differences between natural conditions, and the artificial conditions with which we have surrounded it (such as the change from distant to near vision and the change from use of the eye during daylight hours only, to use of the eye for almost as long

a period during the night), there still remain differences between artificial light and daylight, the studies of which are most interesting. Daylight out-of-doors is the standard against which we must compare both artificial light and daylight indoors. The intensities inside may be from 0.01 to 0.001 of those which prevail out-of-doors in bright sunlight. The quality may differ in respects not perceptible to the eye, and often differs in color, due to the absorption of colored walls, etc., which materially alters the color of natural light. The direction is usually very different. There is considerable discussion as to the desirability of the direction of light prevalent in interiors illuminated by daylight. Coming through a window (or windows) on one side, or two sides of a room, usually at an angle somewhere between the horizontal and 45° above, the light is very unequally distributed. The floor and opposite wall receive the greater part of it, while the wall on the side of the room in which are the windows, is illuminated only by reflection from the floor and the opposite wall. Persons sitting in the room are likely to have the window and the bright sky within the field of vision, or else sit in such a position that their faces are not well lighted. The light is incident upon horizontal surfaces at a very sharp angle, and there is only one good position for writing, or two good positions for reading, if glare from the window or the paper is to be avoided, and the shadow from the body or hand. Practically the only way of bettering these conditions is to utilize a window shade to protect the eye against direct light from the sky, and at the expense of the illumination of the room. The usual direction of the light is in my opinion objectionable, both from the standpoint of utility and good appearance of the room. The proper utilization of daylight for interior illumination is a subject not yet seriously studied.

One quality in daylight, out-of-doors or indoors, which has until recently been lacking in our artificial lighting, is ample diffusion. Interiors are illuminated as a rule from a portion of the sky, the light source being as large as the unobstructed portion of the window. Out-of-doors, even in brilliant sunlight, the skylight is a considerable factor in the total illumination. Early consideration of lighting principles brought realization of the harm from exposed light sources, and led to attempts to conceal the source. There was evolved, among other systems, that of cove lighting, concealing the lamps and permitting the lighting to fall upon a white surface, from which a part of it was reflected into the room. This system is more notable for success in concealing the light sources and diffusing the light than in other respects. Historically, it is notable as evidence of growing appreciation of some of the principles of good lighting. The trouble with cove lighting, as usually applied, is that control of the direction is lost, and that the flux which escapes from the cove is diffused promiscuously throughout the room, producing a flat and characterless effect. Only a small portion is directed where it is most wanted, while perhaps an equal portion is permitted to fall upon surfaces where it is not desired in such quantities. It has been found possible to realize its advantages by other methods free from some of its disadvantages.

More recently another system of indirect lighting has been developed, in which central fixtures are employed concealing the lamp from view and directing much of its light to the ceiling. This system has been widely exploited, and has given considerable satisfaction in a wide variety of installations. Direct lighting in which the great bulk of the light utilized comes directly from the light source, had been much abused. Particularly was it lacking in diffusion. Indirect lighting is the other extreme, possessing high diffusion, its rapid growth being the manifestation of a protest against abuse of direct lighting, and its effect has been to improve direct lighting practice.

In the fixtures shown (Fig. 10), the lamp in the metal bowl is

Room 3. Room 2. Room 1.

Fig. 10.—Indirect Lighting.

backed by a mirror reflector, which directs its light toward the ceiling. The rooms have been equipped with different ceilings—one is white, with a reflecting coefficient as high as likely to be found in practice, another is cream colored, reflecting a smaller proportion of the light, a third is dark cream, approaching a tan, which reflects still less of the light. Indirect lighting is so dependent upon the reflecting qualities that the illumination intensities in these rooms are of interest. The horizontal illumination on the table plane averages:

Type.	Per Cent.
White ceiling	100
Light cream ceiling	87
Dark cream ceiling	58

showing a reduced efficiency of 42 per cent., due to the inferior reflecting qualities of the darker ceiling.

Following the indirect lighting system are systems, classed inaccurately as semi-indirect, in which part of the light is reflected, as in the indirect, while part comes directly from the translucent bowl surrounding the light source. It is obvious that, with any translucent lighting auxiliary in a direct system, some of the light that reaches the ceiling and walls is reflected downward, and that it is thus a semi-indirect system. Units, classed as semi-indirect, are designed with a view to directing a considerable proportion of the light toward the ceiling. The most desirable combination of direct and indirect light for general purposes is a subject of discussion. All kinds of relations between these two components are now available in the open market. Ranging from those in which the transmitted light is so small that it is apparent that the purpose served by the direct component is chiefly decoration; to those in which the direct component is so large as to increase the efficiency by restricting the amount of light subjected to the inherent ceiling loss.

In Fig. 11, three semi-indirect fixtures are shown. Room 1, a direct

Room 3. Room 2. Room 1.

Fig. 11.—Semi-Indirect Lighting.

lighting reflector, inverted. Room 3, a bowl, not intended for this purpose, is employed, and not so efficient as it might be. Room 2 is a hemisphere illustrating semi-indirect lighting in the simplest form.

Illuminating engineers to-day have wide choice among the available equipments for direct, indirect and semi-indirect lighting systems. For some installations one type is preferable, in others some other type may give better results. The good qualities of each are coming to be incorporated, as far as practicable, in all, and the more vigorously each system is exploited the more beneficial upon lighting practice in general will the result be. With a direct system, it is easy to deflect a large percentage of the light downward upon say the table plane, but difficult to so dispose the lamps and equip them that the installation will be free from glare and shadow. With an indirect lighting system it is easy to avoid glare and shadow, but difficult to direct a satisfactory percentage of the light upon the table plane. Where absence of glare and shadow is of paramount importance, an indirect or semi-indirect system may be preferable, in spite of the greater expenditure for energy. Where these considerations are not so important, or where economy is necessary, a direct system may be preferable. In every case the illuminating engineer must secure the best balance possible between economy and absence of glare and shadow.

The three modern systems of lighting are represented in Fig. 12.

Indirect. Semi-Indirect. Direct.

Fig. 12.—Three Common Methods of Illumination.

In room 1, the direct unit transmits sufficient light to make the walls pleasantly bright, while directing much of the light to the table plane; in room 2, the semi-indirect illuminates the card by light

direct from the bowl, and by light from the ceiling and walls in the proportion of 3 to 1—the relative direct and indirect components upon the table plane are 1½ to 1; in room 3 all of the light is diffused from the ceiling, and it is the brightest surface within view. The illumination is very soft and uniform.

Comparing the two end rooms, note that, in room 1, the vertical stripes in the wall paper stand out clear and sharp. In room 3 the stripes are less distinct, due to the lower intensity of light on the wall. Still more important is the downward direction of the light from the ceiling. Viewed from the table, the stripes stand out distinctly, as the angle and direction are then within the zone of strong specular reflection from the wall paper. Viewed as in the photograph, the stripes can hardly be discerned, except near the border. This is an excellent illustration of the of the importance of securing proper direction from the major part of the light, although it should not be taken that the direction is wrong in this installation because the effect would be minimized if the wall paper were viewed from within the room.

With the conditions as established the card illuminations are:

Place.	Per Cent.
Room 1	220
" 2	100
" 3	42

Remember, however, that the direct lighting unit is favored, because the card is immediately beneath it at point of highest intensity. For reading, it is difficult to judge from these figures as to the relative useful light. In the first place, questions of diffusion may result in establishing demands for higher intensities in one system than in another. This is being very generally investigated at present, but in such a review as this its discussion has no place. Considering distribution, it may be noted that most reading would be done near the center of the room, and that, therefore, the direct lighting system should receive some of the advantage in rating from the high intensity of the card immediately beneath the unit. The relative higher intensities in the corners of the room with the indirect, and to a lesser degree with the semi-indirect, are not of much advantage. In this particular installation, with the same flux from the lamps in each type of lighting, the average horizontal intensities are, relatively:

Kind.	Foot Candles.
Direct lighting	1.61
Semi-indirect	1.33
Indirect	0.91

It is generally believed that with conditions suitable for each system the direct lighting system will deliver about twice as much light upon the table plane as the indirect, while each will illuminate the walls moderately.

The decorative feature has kept pace with developments in the other branches of the art. Lighting auxiliaries are consistently improving in appearance. Efficiency of reflection, the necessary degree of diffusion, and the proper direction of light are achieved more and more as experience increases.

The older lines of lighting glassware have been made more pleasing in appearance, while new lines of phosphate and other glass afford alternatives in equipment suitable for any type of fixture in any ordinary installation.

Fig. 13 shows some decorative types of fixtures and glassware now available.

Room 3. Room 2. Room 1.

Fig. 13.—Suggesting Decorative or Ornamental Lighting Units.

The foregoing demonstrations must be taken with some qualifications. They do not pretend to be typical of any particular class of installation, and time has not permitted a thorough discussion of the characteristic qualities of anyone of them, but appearances would have been different had the rooms been observed from within.

The one thing which I hope is recognized is that, if artificial lighting is to be made thoroughly satisfactory, it is necessary to diffuse and otherwise modify the light produced by the lamps. This cannot be accomplished without considerable loss of light, and, therefore, entails greater consumption of energy. Thus, immediate commercial advantage goes hand-in-hand with good business policy and with altruism, when you spread the gospel of good lighting.

[Communicated.]

Benches with Chamber Retorts.

For many years horizontal and inclined retorts for coal gas benches have been made of Ω-shape, as this form presented a large flat bottom surface, which was then deemed necessary for the easy coking of the coal and removal of the coke. The top was curved to form an arch, which was essential for retorts made in one piece, and of clay; but the arched top is not required, when silica is used.

As the temperature of carbonization of recent years is very near the fusing point of clay, clay retorts have been to a large extent superseded by sectional silica retorts, but their shape has remained practically unchanged. Retorts for some recent installations have been made slightly larger than heretofore; but, on the whole, the old standards have been adhered to.

The Gas Machinery Company, Cleveland, is bringing out a larger silica retort, and of an entirely new shape, each retort holding about 50 per cent. more coal than heretofore customary. The shape of the new retorts is shown in Figs. 3 and 4. The method of heating a bench containing 6 chamber retorts is very much the same as had been extensively used for benches containing 9 Ω-retorts.

The customary Ω-retorts usually hold from 50 to 70 lbs. of coal per lineal foot, but these chamber retorts can be charged with about 100 to 110 lbs. of coal per lineal feet; fewer retorts will consequently be required. Also, a much harder coke is produced, as the coal is carbonized in greater bulk.

These chamber retorts must not be confounded with chamber ovens, since in the latter the saddle blocks, or saddle brick between adjoining ovens, form part of the oven wall, whereas with chamber retorts the saddle blocks surround and support the retorts as was customary with Ω-shape retorts. The flame entirely surrounds the chamber retorts, while only the two sides of chamber ovens are heated.

An arrangement for inclined chamber retort is illustrated in Figs. 1, 2 and 3. A horizontal through retort is shown in Figs. 4 and 5, with a combination coal charging and coke pushing machine at one end, and a coke quenching car at the other end of the retort.

The furnaces are on the charging end of the benches, when they are to be charged with coal or small coke, which in many cases is more economical than to burn coke of merchantable size, but the furnace can be located on the discharging end.

Step grates are shown, but horizontal or rocking grates, or separate producers may be used instead. The cost of the retort house for a horizontal or an inclined chamber retort installation, depending on climatic conditions, may be kept very low, as can be judged from the illustrations. A dry collecting main may be used instead of an hydraulic main, and superimposed retorts may have one standpipe in common, as seems most advantageous.

An overhead coal bunker for crushed coal may be located at any convenient point, or a continuous coal bin, extending the length of the benches, may be used to advantage, especially in large installations.

Benches with chamber retorts may contain 4, 6, 8, 9, or whatever number retorts may best suit the local conditions.

The coal charging larry for inclined chamber retorts runs on an overhead track, and may be used, in connection with a scale, to determine the weight of coal charged into each retort. For horizontal retorts an electrically operated charging and discharging machine is preferably used. The advantage of a chamber retort installation, of either the inclined or horizontal type, may be summed up as follows:

1. Coke is much harder and more uniform than obtained from Ω shape retorts, and can be used for some metallurgical purposes.
2. Improved quality of gas, as the gas in the retort is not exposed to excessive superheating.
3. Less ground space required for a given capacity.
4. Less maintenance and repairs.
5. Increased yield of ammonia.
6. Less napthaline troubles.
7. Longer life of retorts.
8. Maximum yield of gas.
9. Easier supervision.
10. Less labor. (For illustrations see following page.)

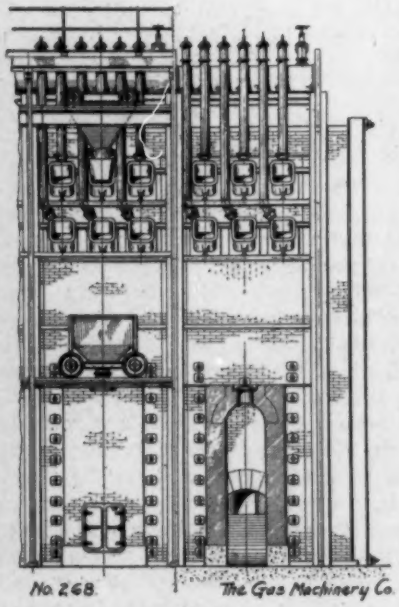


Fig. 1.

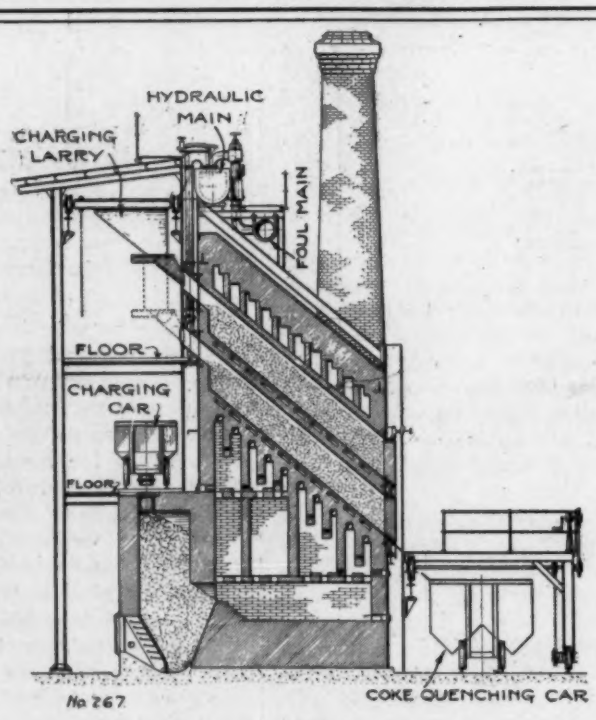


Fig. 2.
Inclined Chamber Retort Installation.

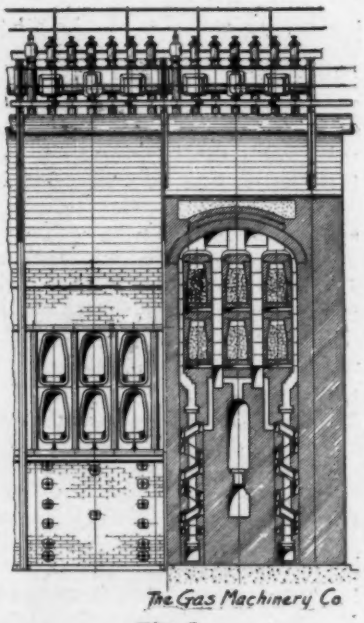


Fig. 3.

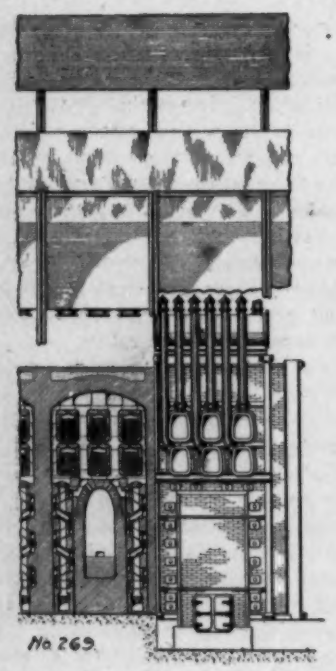


Fig. 4.

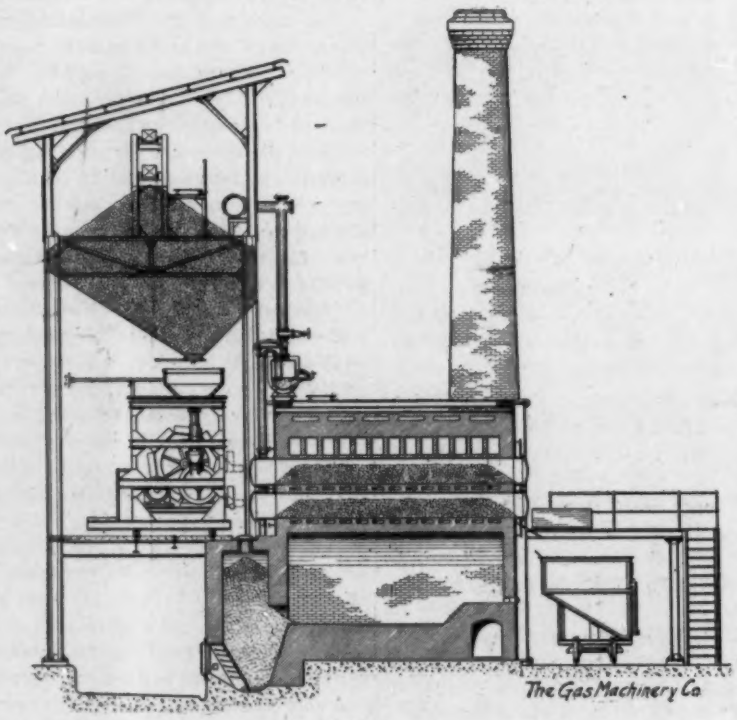


Fig 5.
Horizontal Chamber Retort Installation with Charging and Coke Pushing Machine.

In the Matter of Report of Committee on National Advertising, Proceedings Last Annual Meeting, National Commercial Gas Association.

The following is the text of the report submitted at the last meeting of the National Commercial Gas Association, by the Committee on National Advertising:

To the N. C. G. A.: Gentlemen—It is unnecessary for your Committee to point out what national advertising has done for the development of the various lines of business which have made use of this medium of publicity, but it is pertinent to point out the results that have been obtained in national advertising by public utilities.

The British Commercial Gas Association has conducted its national advertising for two years. The statements made by Mr. Yates and others, as to its efficiency, published in the pamphlet "Concerning National Advertising," and sent to members last spring, are most convincing. Then, too, we have the testimony of Mr. Goodenough contained in the same pamphlet, and this afternoon we have all heard the strong and enthusiastic endorsement of national advertising contained in his paper.

The use of national advertising by utilities is not new. Your Committee does not rest its claim for consideration by the Association, and by the industry generally, on the ground that national advertising is a *new form* of publicity for utilities, but that it is a most *useful form* of publicity. The telephone companies have employed it most successfully, and are still doing so. The Electric Vehicle Association is also using it, and the electrical industry, guided by the results obtained by the Electric Vehicle Association, is about to launch a campaign of national advertising for the development of all branches of its service. It is no longer experimental. The valuable mediums that are available cannot be used by an individual company. Communities that use gas are very closely bound together by business and social ties, and the state of mind of one community is reflected in that of others. Many instances can be cited of gas companies as a class suffering from shortcomings of individual gas companies. It is believed that co-operation in this matter will lead gas companies and manufacturers generally to recognize their responsibility to the industry and lead to closer co-operation in other matters. It is not enough to reach the public directly, but we must also appeal to it through the professional and trade journals, because the public is very largely dependent upon specialists for advice and suggestion.

The arguments for national advertising have been presented by your Committee during the past year and are contained in the pamphlets, "Concerning National Advertising," and "Selling More Gas and Selling It Right." Your President has presented them forcefully in his address. The Public Policy Committee has strongly endorsed the plan, and the Board of Directors of the Association also endorsed it, though it is proper to say two members of the Board, Mr. C. M. Cohn and Mr. J. E. J. Mayer, refrained from voting as Directors, as they were personally not convinced of its relative usefulness or were opposed to the plan. No arguments, however, have

been presented by anyone which cause your Committee to hesitate in the least to recommend the plan presented.

It has been determined that a rate of one-tenth of 1 per cent. of the annual gross revenue is a fair assessment upon all gas companies and manufacturers. It is estimated on this basis $150,000 should be available, and subscriptions have been solicited for a period of three years, with the privilege of withdrawal after the first year, if the result does not prove satisfactory to any individual company. A Board of Trustees has been appointed, namely:

Mr. Thomas N. McCarter, President, Public Service Corporation of New Jersey.

Mr. George D. Roper, President, Eclipse Gas Stove Company.

Mr. A. H. Humphrey, President, General Gas Light Company.

Mr. Lewis Lillie, Chairman, Third Vice-President, the United Gas Improvement Company.

These will be in full control of the fund and responsible to the industry for expenditures. Incidentally, it may be mentioned that an advertising agency has been called in for advice, and considerable work has been done in preparation for the campaign. The subscriptions received to date do not, in the opinion of your Committee, measure the progress that has been made. The subscriptions amount to over $55,000 from 120 companies. The development of sentiment in favor of the campaign has been continuous. The absence of a date in which subscriptions must be made to make the plan operative, has, we believe, led companies to delay action in sending in their subscriptions. It should be said here that the Committee has not solicited cash, but pledges, and doubtless some misapprehension on this point has caused many other companies to fail to act. Even though some subscribers have been on the list for a year, there has been no request for the withdrawal of a subscription. It is evident that the faith of these companies that have subscribed must in time affect those who still hesitate to pledge their subscription. Your Committee is aware that some companies, before subscribing, wish to see evidence of the results which they individually would obtain. Such an attitude is not one of co-operation. The plan cannot be started without subscription, and if subscriptions are withheld because the work is not started a deadlock naturally takes place.

The Committee feels that, if the busy men who are responsible for the management of the gas business in the towns from which no subscriptions have been received, will only study national advertising as applied to the gas industry in all its phases, and in the light of results obtained in similar enterprises, they must see that it is to their company's interest to join in this movement to bring gas into its own.

Respectfully submitted,

A. P. Brill,
Thos. R. Elcock, Jr.
P. S. Young, Chairman.

The discussion was opened by Mr. C. M. Cohn, of Baltimore, whose remarks will be found in Journal for December 22, 1913, on page 392.

Mr. Hare's part in the discussion was: I think it is essential that this entire question be discussed with the greatest freedom at this time. This is the time and place for the gentlemen who are opposed to the plan of National Advertising to come forward and state the reasons for their opposition. Mr. Cohn would lead you to believe that the Association did not have the right to go into National advertising. I draw your attention to the fact that Article 2 of our Constitution states that "The objects of this Association shall be: First, the development of the use of gas and the promulgation of methods necessary for its sale." National advertising is, of course, one of the methods that this Association has adopted in order to further the sale of gas. It is one of the policies of the Association and the matter is not before us for adoption or rejection at this time. We are discussing the report of the National Advertising Committee, and the discussion should be confined to an approval or disapproval of the work of the Committee during the past year. I believe that Mr. Mayer (Chicago) is opposed, either to the plan of National advertising or to some portion of it, and there may be others present who are either opposed to the entire plan or to some portion of it. I, therefore, move that necessary time be allotted by the Chairman to enable those opposed to National advertising and those in favor of it to express their views with perfect freedom. [Motion put and adopted.]

The Chairman, in inviting discussion, called on Mr. Mayer, who declined to speak. He then asked if anyone representing St. Louis in the convention cared to say anything, to which query there was no response. Mr. Percy S. Young (Newark, N. J.) was then appealed to, whereupon Mr. Young spoke as follows:

The Committee has known that Mr. Cohn has been opposed to the plan of National advertising, but this is the first time that his reasons have come to its knowledge, and the Committee is glad he has taken this opportunity to express his views, but we believe that, to a great extent, the objections raised are imaginary. It is true that all the details of the plan have not yet been worked out, that the question of how to connect the publicity matter with those responsible for it, so as to create confidence in its source, has not been settled; but the character of the matter published will be convincing in itself and, if desirable, the National Commercial Gas Association could stand sponsor. Who, in Philadelphia, after this splendid exhibition and convention, would question the propriety of its message? The Association's name and action would dispel all criticism of the source. Mr. Cohn believes that no one should come between gas companies and the gas consuming public; that gas companies should deal directly with their consumers. Your Committee agrees with him in this, and that close relations between a gas company and its consumers should always be maintained; but this does not mean that a local company should be so jealous of its consumers that no one else should say a good word for gas. Would Mr. Cohn object to a gas consumer from another town speaking about the good results obtained from the use of a special gas appliance to a consumer in Baltimore, or to a consumer in Baltimore saying a word in favor of gas for some particular purpose to his next door neighbor. No local company can afford to use these National mediums by itself, and the character of copy used by the Association would have little to do with the views and policies of local companies. Local advertising must supply that information. The function of National advertising would be to popularize and extend the use of gas. Of what is Mr. Cohn afraid? There can be no danger of National advertising controlling the sale of gas in Baltimore or anywhere else. It can only help to prepare the soil for the seed that the local company may sow by local advertising and solicitation, and which will grow to full fruition by cultivation and good service. Mr. Cohn also fears that National advertising might raise the cry of community of interest between gas companies for purposes prejudicial to the public interest, and that the pursuit of greater sales of gas by the companies would mean that the companies were more interesting in increasing earnings than in making economies in operation and furnishing good service. Such ideas could never remain in the minds of consumers. National advertising would dispel these ideas were the latter as prevalent as he fears. It is easily demonstrable that gas can only be sold if it fills a need more pressing than some other want, and does its work more satisfactorily than any other medium for the same price. That being so, it can readily be proved that increased sales mean increased production, which is a sure means of reducing unit cost without sacrificing service. National advertising will be a benefit to the companies because it is a benefit to the consumer. Mr. Cohn does not believe that the success of National advertising in developing a market for other commodities proves that National advertising in connection with gas will be successful; perhaps it does not, but this success certainly does not prove that National advertising would be a failure with gas as the commodity to be advertised. We have no closer comparison for National advertising of gas than the advertising mentioned in your Committee's report as having been conducted by the English gas companies, by the American Telephone and Telegraph Company and by the electric industry, nor can the conditions be more nearly paralleled. It remains for the plan to be tried. The industry is asked to raise $150,000, and the assessment against each company is small. One year's trial will demonstrate its value. The cost is only 1/10 of 1 per cent. of the annual gross sales, an amount not more than 1 per cent. of the annual increase in sales, in the cases of a great many companies. The industry wants to be placed in the position that the advocates of the plan believe National advertising will place it. Isn't the plan worth trying? Each gas company in these days is affected by the policies of other companies. It is no time to be selfish, for to be selfish is to be shortsighted. Co-operation is necessary for progress. Every gas company and gas appliance and apparatus manufacturer should subscribe and take an interest in the carrying out of the purposes expressed in the Committee's programme.

Mr. E. N. Wrightington—I believe the report of the Advertising Committee is before us for action. I do not understand that the question of whether the Association should adopt National advertising is before you in any way save merely the report of the Committee as presented to you showing the work which has been done

(*Continued on page 74.*)

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NOTICE TO ADVERTISERS.

New Advertisements and changes of copy therefor should be in hand Wednesday noon of week prior to date of issue.

NEW YORK, MONDAY, FEBRUARY 2, 1914.

[Official Notice.]

Forty-fourth Meeting, New England Association of Gas Engineers.

New England Association of Gas Engineers,
Office of the Secretary,
East Boston, Mass., Jan. 6, 1914.

To the Members, New England Association of Gas Engineers: The Fourty-Fourth Annual Meeting, New England Association of Gas Engineers, will be held, Wednesday and Thursday, February 18 and 19, 1914, at Young's Hotel, Boston.

Papers on timely topics of interest are being prepared.

Applications for Membership should be sent to the Secretary before February 17th. "Questions" should be sent early so they may receive ample consideration.

The annual dinner will be Wednesday evening the 18th.

N. W. Gifford, Secretary.

[Official Notice.]

Annual Meeting, Indiana Gas Association.

Indiana Gas Association,
Office of the Secretary,
Indianapolis, Ind., January 24, 1914.

The annual meeting of the Indiana Gas Association will be held at Terre Haute, Ind., Wednesday and Thursday, March 11th and 12th, 1914, the sessions each day beginning at 10 A.M. The headquarters will be the Terre Haute House, where 70 rooms have been reserved for the convention delegates. It is advisable that early application be made for reservations. If the available rooms are all spoken for, reservations may be made at the Filbeck, Plaza, or Great Northern Hotels. The programme includes these numbers:

Address by a Member of the Public Service Commission of Indiana.

President's Address, by A. S. Cooke, Terre Haute.

"Employers' Compensation," by O. O. Thwing, Chief Engineer, Western Gas Construction Co., Fort Wayne.

"Light and Illumination" (demonstrated), by R. F. Pierce, Manager, Illuminating Engineering Laboratories, Welsbach Company.

"Calorific Value, as Expressing the True Quality of Gas and Conditions Governing Its Supply," by J. B. Klumpp, Inspecting Engineer, United Gas Improvement Company.

"Yields of Gas from Coal as Related to British Thermal Units," by J. C. Silverthorn, Superintendent, Evansville (Ind.) Public Service Company.

The Association will consider the question of revising its Constitution and By-laws, so as to provide that any member whose dues shall remain unpaid for a term of 1 year (instead of 3 years, as at present provided), may, at the discretion of the Executive Committee, be dropped from the roll of membership. Philmer Eves, Secy.

BRIEFLY TOLD.

Mid-Winter, Joint Meeting, Empire State Gas and Electric Association and Eastern New York Section, Nat. Elec. Light Association.—The Committee (Messrs. L. M. Scherck, E. C. Peebles and M. H. Collins) of Arrangements, mid-Winter meetings, the Empire State Gas and Electric Association, has mailed to the members an interim circular, in which is graphically detailed that proposed for accomplishing, at the next meeting, to be held in the Edison Club, Schenectady, N. Y., Thursday, Friday and Saturday (5th, 6th and 7th inst.) of this week. The sessions are to be in jointure with those of the Eastern New York Section, the National Electric Light Association. The programme lists the following procedure: The first morning's session will be commenced with a paper, by Dr. William McClellan (formerly Engineer, Public Service Commission, Second District), whose topic or subject relates to "Various Matters Affecting Public Opinion Towards Gas and Electric Companies." The Committee has arranged that each of the points brought out by the author will be referred, prior to the meeting, to someone who will come prepared to lead the discussion respecting the assigned particular point; but, of course, all are expected to take part in the general discussion. The paper will be followed by a buffet luncheon, to be served in the Mohawk Club. At 2 P.M. the business sessions will be resumed, and the main matter for consideration will be a paper, by Mr. C. W. Stone, Manager the Lighting Division, the General Electric Company, whose story will have to do with the "Commercial Aspects of New Lamp Developments, with Retrospect as to the Effect of the Mazda Lamp on Company Earnings." Following the Stone presentment, the meeting will consider routine announcements and reports. The evening will be notable for a dinner, which will be served in the handsomely appointed house of the Country Club. This function will be directed by that well-tried entertainer, Mr. R. M. Searle, of Rochester, a Past-President of the Association. It is further promised that a "surprise" in the way of entertainment will be afforded, in that certain of Schenectady's cleverest exemplars along such lines will contribute thereto. Saturday will be given over to a visit of inspection to the respective plants of the General Electric Company and of the American Locomotive works; also, an inspection of the imposing new coal gas plant of the Mohawk Gas Company has been arranged for. In closing this well-worded invitation-circular the Committee justly remarks that the "importance of the subjects to be discussed should insure the attendance of a representative from every member of the Association."

New York Section, "Gas Meeters," January Reunion.—The January gathering of the New York Section of the Gas Meeters was held on Thursday last, at Kalil's Restaurant, their old and original place of meeting. Some 60 meeters enjoyed a good dinner served in the Rathskeller, eight of these being new members, enrolling then. The "Benefit of Industry" feature of the evening, pulled-off by Chairman Pettes, was the calling upon each one in attendance, in the order of seating at the tables, to give, in less than two minutes, an account of something that he had done, or thought, or heard, that would interest the others. This trial brought out a lot of little good things, and it was in order to make notes of those that appealed to one. This was the first meeting since October, and "Good Fellowship" was much in evidence. A pleasant surprise was the attendance of General-Secretary, Thurston Owens, of La Crosse, Wis.

CURRENT MENTION.—

The election of officers for the ensuing year, in the La Crosse (Wis.) Gas and Electric Company, resulted in the following namings: President, J. H. Brewer; Vice-President and General Manager, Thurston Owens; Secretary, Blaine Gavett; Assistant Treasurer, W. J. Ripley. The named result, which really means the reelection of the local force, that served the American Public Utilities Company so faithfully and well last year in its La Crosse division, is particularly gratifying to us, in that the renaming of Mr. Owens to the dual position of Vice-President and General Manager, proves that that clever gentleman has made good. Certainly Mr. Owens, prior to his going to La Crosse last year, was well-known to the fraternity from his editorial connection with the Journal, and he will be better known now from his success with the American Public Utilities Company. The Company, too, it may be said, gave him a free hand, with the result that Mr. Owens and associates worked in such nice harmony that great things were accomplished during 1913.

In proof of this we note that, in a public statement, issued from the Kelsey-Brewer Company's headquarters in Grand Rapids, Mich., under date of the 26th ult., it is said: "In the interest of economy and conservative management, the American Public Utilities Company, during the month of December, 1913, at its La Crosse property, effected a net saving of $2,300 in raw materials used in the manufacture of gas. This was the result of recent improvements made to the property, and it is estimated that this saving for the ensuing year, when compared with the returns for 1913, will amount approximately to $33,000.

MR. KING G. KELLOGG, who since 1910 has been Chief Engineer of the E. E. Brownell Engineering Company, will sever that connection the last day of the current month. He proposes to thereafter devote his time to consulting work, specializing in respect of matters pertaining to electrolytic corrosion of underground metallic structures from stray electrical currents. Along these lines Mr. Kellogg has had wide and valuable experience, for the installing of several electrolytic mitigation systems was completed during his engineering connection with the Brownell concern. In fact, he has conducted electrolytic tests and examinations in more than 50 cities in this country. Mr. Kellogg is really of the gas ranks, for, prior to his connection with the Brownell concern, he held, during a period of 16 years, various positions on the engineering staff of the Peoples Gas Light and Coke Company, of Chicago. He was educated in the public schools of Chicago, and is an alumnus of the University of Illinois. Mr. Kellogg will retain his offices in the premises, 1836 South 56th street, Philadelphia, Pa.

THE last week in January the Directors of the Milwaukee (Wis.) Gas Light Company authorized the payment of a bonus of 10 per cent. on the wages of those who may be termed seniors. The plan is annually operative, and one of its tenets specifies that an employee to share in it shall have been on post a specified number of days each year, exception, of course, being made to the time given for vacations. The plan this year will require the distribution of over $18,000.

"T. D.," writing from St. Louis, Mo., under recent date, says that, towards the close of last month, 75 coal dealers of St. Louis were guests at a luncheon served in the Mercantile Club, at the instance of the M. W. Warren Coke Company, which corporation is to distribute the product of the new coke oven plants of the Laclede Gas Light Company. Mr. P. H. Woods, of the Warren Company, acted as toastmaster, and speeches were made by: Dr. Max C. Starkloff, Health Commissioner; E. R Kinsley, President, the Board of Public Improvements; William A. Hoffman, Inspector of Boilers and Elevators; Thos. D. Miller, of the Elkhorn Coal Company; and Edward Derry. The luncheon really marked the beginning of a propaganda for the domestic use of St.-Louis-made coke. And the rather disquieting remark was made by Dr. Starkloff that the use of soft coal was costing the United States more than $500,000 a year, because of damage from smoke and soot. Disquieting, however, as was the Doctor's remark, others present declared that his estimate was altogether too low. They all agreed that the general use of coke as fuel would make for the health, cleanliness and comfort of the residents in large cities.

THAT the M. W. Warren Coke Company means business policy of a high type is shown in its initial efforts to create interest by large display advertisements in the daily newspapers, setting forth in fine fashion what can be accomplished by the general use of coke instead of soft coal. The Company has also prepared a booklet in which these advantages are set forth at great length, the proper ways and means of using the fuel being minutely and clearly explained. The product (to be known as "Elkhorn-Laclede" Coke) is to be marketed in these 3 sizes: Nut, stove and egg. And it will be delivered in any required, specified quantity. The headquarters of the Warren Company are in the Laclede Gas Building.

THE mid-January meeting of the Suburban Gas and Electric Club, C. H. Tenney Company, Revere (Mass.) division, met, as per notification, in the Club rooms on Railroad street. Forty odd (including several guests from out-of-town) reported, and all enjoyed an excellent supper, under the splendid direction of the House Committee. Shortly after 7 o'clock the regular business session was opened, and routine matters were tabled so the members could better comprehend the semi-scientific presentations arranged for. The first of these was made by Mr. A. W. Crookes, of Hyde Park, whose theme had to do with progress manifested in the study of ventilation, in which field gas as an aid was making tremendous strides. Mr. T. Thompson, of the Welsbach Company, of New England, followed with a most entertaining narrative respecting lighting by the agency of the Welsbach mantle lamps. Both presentations were admirably illustrated through the agency of stereopticon slides, deftly handled.

MR. HENRY A. HALE, JR., for some time Mechanical Engineer with the Salem (Mass.) Gas Light Company, on the first inst. took up the work of Traveling Inspector of gas and mechanical plants, the Massachusetts Liability Insurance Company. The Company has certainly secured the services of a thoroughly competent, straightforward man.

MANAGER HOWARD BRAYTON, Citizens Gas Company, Greenwich, Conn., reports the taking of title to the Palmer & Duff property, Cos Cob, as a site for the plant. Mr. Brayton says the plant will be in working order by July first, but if it is, his associates will deserve credit for great speed.

Publications.

[All Publications, Catalogues, etc., mentioned below, are kept in our office for the convenience of our patrons.]

"*Bayley & Sons Catalogue.*"—The new catalogue of Messrs. Bayley & Sons, designers and makers of fine lighting fixtures, comprises 125 pages, 9 by 12. Besides showing examples of their lines of standard fixtures for gas, electric and combination, it splendidly illustrates the latest designs in "Equalite," semi-indirect fittings. An interesting feature is the full-page picturings of typical installations of recent date, showing the wares in some of the very modern theaters, in the display rooms and work rooms of several new gas company buildings and in well-known department stores. The cuts of the fixtures and special glassware are well made and well printed reproductions of practical and artistic wares.

"*Eclipse Rays,*" the monthly publication of the Eclipse Stove Company, is a little different from most manufacturers' periodicals. While primarily featuring the Eclipse products as one would perforce expect, it aims to give information of a general character in appliance trading matters, with suggestions of value to anyone looking for something a little different from what they have been doing. For instance, the January number has articles on "Planning Water Heater Sales," "Discouraging the Sale of Freak Appliances," and on the question of "Standard Specifications for Appliances."

"*Coal Washing in Illinois,*" by F. C. Lincoln, has just been issued as Bulletin No. 69, by the Engineering Experiment Station of the University of Illinois. Although 85 coal washeries were built in Illinois, treating, at present, over 3,500,000 tons of bituminous coal a year, the only data concerning them, available to operators and engineers, is a somewhat scattered literature in various trade journals. This Bulletin discusses briefly, the theories of crushing, screening, and washing coals, followed by descriptions of the important types of coal washing machines. Next come flow sheets and discussions of various Illinois washeries, and these are supplemented by carefully compiled data relative to different phases of the work. The author visited many of the largest washeries in the State, secured data covering costs and methods, and obtained samples of the washery products. This information has been compiled in a number of valuable tables, and shows the wide variance in cost and washing efficiency among the various plants. The Bulletin is completed with an article on "Moisture in Washed Coals," by S. W. Parr.

"*Welsbach Company's Literature.*"—The latest publications of this Company are particularly valuable and interesting, including, as they do, an addition to announcements of new shades and fittings for the No. 20 Reflex and standard lamps, lighting data for small stores, and a pamphlet, by Mr. R. F. Pierce, on the "Hygienic Value of Gas Lighting." The lighting data is on sheets to fit the N.C.G.A. "Handbook" or the "Welsbach Data Book," and gives illumination data on eight typical installations of store lighting that are sufficiently diversified to be of wide value in laying out examples of commercial lighting. The booklet on "Hygienic Value" gives, in concise way, all the good effects from gas lighting, and answers to the objection always urged by our electric competitors. In reality the work is a very good thing to give to your old customers as well as to your prospective ones.

"*Brown Hoisting Machinery Company's Pamphlet C,*" 1914, deals with its safety crabs and winches, which are fitted with the "Weston Safety Lowering Device," making it impossible for handles to fly back or for the load to drop. Safety of operation is the first thing to be considered with crabs and winches, and a good one is a valuable tool in the works and on street work. The standard winch can be gotten for either double or single shear pole, mounted in cast iron frames.

(*Continued from page* 71.)

during the past year. Mr. Cohn has stated his personal objections to National advertising, but I disagree with him, in that he seems to think nobody in Baltimore is going to read the magazines; that the money put into magazines, so far as it concerns Baltimore, is only going to reach somebody who reads magazines out in San Francisco. I decided to go into magazine advertising for Boston, because I knew that thousands of people in Boston would read the magazine. I found it would cost only $23 a page for our Company to get that advertising, where it costs $56 a page to go into our weekly newspapers in Boston. It seems to me every city is affected the same way. There cannot be any question about the value of the advertising. I am presenting this point so that you may be able, possibly, to get some idea that may be of value for your own company, that you may figure out for your own company just how much it will cost to secure the advertising that will reach the prospects in your vicinity. Never mind about the rest of the country. That is interesting and valuable in the development of the gas industry as a whole, and a lot of things go with it; but get it right down to a local proposition. "Will it pay your company to do it?" I thought it would pay for Boston. My President agrees with me, and is very enthusiastic about it, in spite of the fact that Boston to-day is up against a proposition, probably similar to many others, an expense in our case of $250,000 extra for oil for the coming year. At the same time we are putting money into this advertising scheme—ready to do it. I move that the work of the Advertising Committee be endorsed, in carrying out the policy of the Association, that it be thanked for the work which it has done, and that all at this gathering, if their companies have not already subscribed, secure that subscription. [Seconded and adopted.]

Maker-Dealer Co-operation in Advertising.[1]

[Paper by Mr. W. F. O'Donnell, last meeting, National Commercial Gas Association.]

No effort has been made in a broad way to create a community of interest between the maker of gas appliances and his gas company patrons in the matter of advertising. In a few instances it has been given serious attention, some manufacturers maintaining capable advertising departments placing at the disposal of gas companies an advertising service intended to stimulate the retail sale of their appliances. What we propose to consider here is how such service may be given by all manufacturers and how gas companies may best profit by it.

We must realize that adequate maker-dealer co-operation in advertising must be reciprocal. That is, the burden must not rest upon either the gas company or the manufacturer alone. Most gas companies do not realize what it means for the manufacturer to spend his good money to supply electrotypes and printed forms. They do not realize the expense to which he has gone, nor how seriously this expense affects his overhead expense; and that, whether it increases or decreases the price of appliances to the gas company, depends entirely upon the latters' interest and activity in making use of the advertising.

Take, for example, a booklet, that cost the manufacturer 10 cents per copy. He submits a sample to a gas company, offering to have a quantity printed bearing the name of the local company and local prices. If the company requests 5,000 copies it means an outlay of $500 by the manufacturer. Obviously, an increased sale of appliances in that territory should be looked for sufficient to show profits of at least $500. But if the company stacks up the booklets in a back room, forgets about them, or distributes them, and does not make any serious effort to follow them up by energetic salesmanship. What is the result? The manufacturer is $500 out, and, unless the distribution of his literature in other cities is satisfactory enough to offset this, he must increase the price of his appliance to keep his head above water. This line of reasoning applies to folders, circular letters, post cards, window trims, newspaper electrotypes and all other forms of advertising. Assuming that the advertising is of good quality, everything depends upon the co-operation of the local company. In considering this co-operation, we must confine ourselves strictly to local advertising. What the manufacturer does in periodicals of national circulation must be in the way of general publicity. The intent clearly is to create at large an interest in one's products, so that the demand will be felt by the local gas company, and the goods of that manufacturer will have to be ordered because the public demand them. If the article advertised nationally is listed by a local company, there is a sort of co-operation which can and should be exercised. Let us say, for instance, that a certain make of gas lamp is advertised in national magazines. Suppose that, in a city of 50,000 population, the circulation of that magazine is 5,000. Say 5,000 of the local company patrons read of an appliance, but do not see the company's name in connection with it, and here is where a company should make capital out of the enterprise of the manufacturer. Either a mailing piece, a newspaper advertisement, or both, should be used, calling attention to the advertisement in the magazine, stating that the appliance in question can be secured from them. It should have a window display of the appliance, and should direct its sales force to make a special drive in this while the advertising is current. Of course, if the newspapers are used, the local company should pay for the advertisements, but it would be reasonable and logical that the manufacturer send copy for the advertisement; or, better still, an electrotype. If mailing pieces are used, it would be well for the manufacturer to have them printed and sent to the company; and to send a diagram of a window display which would properly tie up with the magazine advertising. This national advertising is very expensive, and the manufacturer cannot hope to secure adequate returns from it if he depends entirely upon the impression he makes through the advertisement. In direct returns what the manufacturer does to aid the local company to tie up with his national advertising, will be by far the most productive. It is, therefore, urged that manufacturers doing national advertising, have system in their offices, whereby the local companies be notified when such advertising is to appear with instructions how to derive the most benefit from it.

It is of vital importance that a manufacturer who does any considerable amount of business should have an advertising department. If, however, his business is not great enough to warrant this, he should have the services of an advertising agency, and should not attempt, by his individual efforts, or those of a clerk, to supply the publicity requirements of his customers. This latter procedure will invariably be more expensive and less satisfactory than if he hires a specialist. Good advertising is not a hit-or-miss proposition, but an exact science, and the trained man or organization must secure better results than any untrained individual. A very large proportion of the money wasted in advertising can be attributed to the fact that some officer of a company writes the advertising or has it done by some untrained member of his family or organization.

A man may show great astuteness in business and be guilty of amateurish innocence in the matter of advertising. He strikes off copy, which to him seems literary or brilliant, or perhaps he has it written by a son or daughter, who having only taken a prize in school for writing a composition, is, therefore, qualified in the estimation of the parent to write advertising to sell goods. It may be a very fine piece of literature, but for selling goods it will be found, almost invariably, that it does not contain the "selling punch," and that the money paid to print it is simply an expensive tribute to the vanity of the man who foots the bill. None but a trained advertising man can have the thorough knowledge of follow-up system, checking methods, and engraving and printing, which all play parts in the production of advertising.

If our manufacturer has his own advertising department, or buys the service of an agency, how much money shall he spend? Perhaps 5 per cent. of the estimated sales for a year would be a satisfactory average. That is, if a manufacturer does a business of $500,000 a year, he should spend at least $25,000 for advertising. A part of this fund must go for advertising in trade journals to reach the gas companies; the rest should be devoted to advertising to help the companies. Having determined the amount of money to spend, the next question is how to spend it. This proposition is naturally divided into four classes:

1. Follow-up literature.
2. Newspaper electrotypes.
3. Window trims.
4. Demonstration.

Let us first consider follow-up literature. The copy man, if he be qualified, will prepare the illustrations and copy for his folders, booklets, post cards, etc., to appeal to the consumer rather than to the gas company. This unfortunately is often overlooked. Remember that the consumer is not primarily interested in the mechanical construction of the appliance, but in its use in his home or place of business. The human interest touch must be given, and a breezy, inter-

1. Slightly abridged.—Eds.

esting style should permeate the copy, bearing in mind that the aim is to bring the consumer to the gas company's office. Of course, the name of the manufacturer must appear, but the name, address and telephone numbers of the gas company should be not less prominent.

One exception to this practice, is when advertising literature is sent out from the manufacturer's office to a list of prospects supplied by the local company, merely informing the consumer that the goods can be had from the company. The idea back of this is that Mrs. Jones may be tired of receiving envelopes bearing the imprint of the local company, but would find it a novelty to receive a letter from someone in New York, Philadelphia, Pittsburgh or Chicago. While this may not seem logical, the fact remains that where it has been tried it has given very good results. Of course, it should be done only now and then, to relieve the monotony.

When follow-up literature, bearing its imprint, is ordered by a gas company, care should be taken to request only the number of copies desired, inasmuch as any waste is only an extra expense to the manufacturer, which must in some way be made up. The quantity should be based upon the actual prospects for the appliance, and any company not keeping an index file of prospects for various appliances is certainly not in a position to make use of follow-up matter. Any advertising sent out indiscriminately is money thrown to the winds.

Having received the mailing piece, the company should do its part intelligently and forcefully. They should be sent out, not all at one time, but gradually, and to prospects where the salesmen can call within the next week. A good plan is to have the envelopes addressed and stamped from day to day, as the salesman directs, so that the dates will be fresh. Supervising this will not take up much of the salesman's time, and he will find it advantageous to have it done under his direction.

The question naturally arises as to how the manufacturer will know whether the expense of getting out this printed matter has been justified? Should he take it on faith, or have the company report the proportion of post card returns or visits to the office traceable to the advertising? There may be some differences of opinion on this, but some representative manufacturers say that the only gauge worth while is that of increased sales in the territory. One manufacturer told me that, where his campaign was energetically and intelligently used by a company, an increase in the sales of his appliance of 100 per cent. had almost invariably been the result; but that where the advertising was sent out haphazard, or not at all, or not followed up promptly by the salesman, there was no appreciable increase. He said gas companies that did not make proper use of advertising ought not to be supplied with further forms; but that, as a matter of business policy, he could not afford to so inform them and continued to send the form with the full knowledge that it was wasted.

Co-operation between the maker and dealer is almost sure to be helped by a good house publication. Such a reminder can be used not only to create a live impression of the goods in the minds of the retailer company, but also as a vehicle for hints and descriptions which will aid the local company in its advertising.

It is a mooted question whether a newspaper advertisement can be prepared which, while necessarily of a stock nature, will be adapted to the conditions and requirements in every city. I believe it is possible. One gets out of patience hearing that this or that city is different and that a special line of advertising in such territory is necessary. The experience of competent advertisers is that human nature is the same the world over and that the piece of copy that will attract attention in one city will have the same effect in another. It is possible to get up electrotypes of a human-interest nature, leaving space for the price of the appliance, and the imprint of the local company. If some special proposition is to be made by the local company, it could make known its want so that the manufacturer's advertising man could write special copy. As has been said before, the local company should pay for the insertion of advertisements in the newspapers, but it seems reasonable to expect the manufacturer to supply the electrotypes.

The wise manufacturer will not lose sight of the advantages to be gained by supplying attractive window displays to his patron companies. Such displays are grouped in two divisions. One is the more pretentious traveling display, including a mechanical figure and entailing considerable expense; the other consists merely of window trims, cards, etc., in connection with the appliance. For any traveling display, the manufacturer should have at least 25 complete outfits, so that companies throughout the country may use them almost simultaneously. They should be complete, excepting for the appliance, which the local company should have in stock. Besides the mechanical figure, there should be borders, background, flowers or ornaments, lithographs and properties in general. These should be securely packed in a box and sent to the company with an easily understood plan of erection, and explicit directions for repacking. Upon receipt of such a display the local company should see that it is carefully unpacked and properly set up and, having been used, that it is carefully repacked and shipped to the manufacturer or to another company. Remember that, as the manufacturer has spent money on the display, and that another has to use it after you, it is your duty to keep it clean and pack it so that it will not be broken in transit.

Such a display should be of an elastic character so that, if the window is small, some details may be omitted, still leaving a harmonious arrangement. It must be substantial to stand frequent shipments and conform to good advertising principles.

What has been said about a traveling display will apply to the less pretentious display, which the gas company keeps. It is well, even in a small company, to have some one person detailed to take care of window displays as salesman or clerk or stenographer, but the manager should select some one of good taste, one who can be depended upon to take an interest in the windows. In almost every town some store has a window dresser, and the gas company's employee should find it possible to consult that window dresser to get good ideas.

Demonstrating is properly considered a phase of advertising. In using the word "demonstrator," however, we do not wish to confuse it with "salesman." It is doubtful whether a gas company should presume to ask a manufacturer to send a salesman to the town to help sell his appliances. It seems the most that could be expected would be that he send some one to demonstrate the appliance in the gas company's office and give instructions to the sales' force. Remember when a manufacturer sends a demonstrator, he goes to considerable expense, and your reciprocal duty is to make the best use of that demonstrator while with you. Have you not known managers who permitted the manufacturer's instructor to cool his heels about the office for a day or two before receiving attention, presumably because it would interfere with some other duties under way? And do you consider that the manufacturer has been given a fair show? Surely this is not in line with the broad idea of maker-dealer co-operation.

Upon receiving the right kind of advertising co-operation from a manufacturer, is it not fair to show in every possible way that the service is appreciated, and to prove by increased sales of the manufacturer's appliances that the best use has been made of them? Is that local company sufficiently discharging its co-operative duty which, upon receiving the advertising service of one manufacturer, tips off a rival manufacturer so that he may also get in on the game? Or is the company doing its full duty, after using such service and creating a demand for an appliance, if it dismisses that manufacturer and uses the goods of a rival, except for good business cause? Does it not after all appear that something more than mere price should govern the selection of your line of goods? Who is more worthy of your consideration, the manufacturer who sells his goods to you at a low price and permits them to encumber your floors, or that manufacturer who charges a fair price and supplies an advertising service which aids you to keep his goods moving? Viewed in the cold light of dollars and cents, who would you favor?

Special English Correspondence.

COMMUNICATED BY NORTON H. HUMPHRYS.

SALISBURY, ENGLAND, January 10, 1914.

The Trend of Events During 1913.

Naturally our thoughts turn, at the beginning of another year, to the one now drawn to a close. While not marked by any stirring event such as the coal strike of 1912, it cannot be said to have been uneventful, or to present that placid state of prosperity usually expressed by saying, "Happy is the nation that has no history." In that respect the gas industry is not altogether happy, though it has maintained a state of prosperity. Maximum dividends without increasing the selling prices have been general, in spite of dear coal, dear oil, increased price of metals and materials of all kinds, and continual growlings and mutterings indicating a state of unrest in the labor market, which have been so marked as to bring all kinds of labor saving mechanical devices into prominence. The National Insurance Act has thrown a heavy strain upon gas undertakings as

upon all other public utilities that maintain a constant service. Absences on account of sickness are more than doubled, with the result that a reserve equal to 4 or 5 per cent. of the whole staff must be kept on the books. The general experience of sickness absentees over a term of years has been under 2 per cent., and this year it has been more like five. The inconvenience and expense caused by a large absentee percentage, where the work is done in gangs, which applies to a large portion of the ordinary gas works' operations, is obvious. The understudies take some time to warm up to their work, and to accommodate themselves to their new surroundings.

An unusually mild Autumn has reduced the demand for gas, and to a greater extent that for coke. As a general rule the price of coke follows that of coal, and we look to it to help meet an advance. But at present, in many parts of the country, there is the unusual feature of cheap coke accompanied by dear coal. This has been accentuated by the high price of oil, which has led to the closing down of many carbureted water gas plants. The alternative plan of making a blue gas, and resorting to cannel, or benzol, as enrichers, does not appear to have been considered, to any extent. But particularly where there is a glut of coke it is well worth attention.

That our industry has been able to meet all these additional burdens, is at once an evidence of strength and vitality. With the exception above noticed, sales of residuals have been satisfactory, and have helped substantially towards a reduction of the working expenses. The remainder has been covered by improved working. High prices of material are not an unmixed evil, because they afford an additional stimulus to research and advancement in the direction of a larger yield of gas, of a reduction in purifying expenses, in the adoption of machinery in place of costly and unreliable hand labor, and generally in all round economies. And these remain permanently with us, after the disturbing cause that assisted their birth has passed away. Looking back over the last 50 years, it is possible to connect the origin of some permanent improvement with every epoch of dearness and difficulty in respect to material, and it has been followed, though at some considerable distance, by reduction in price to the consumers as a consequence. But this does not entitle the middlemen and factors, who are at present scooping enormous profits on advance in price at the pit bank, to claim that they are benefactors to the industry or to the public, because if the effect of their operations does not become evident in the form of increased prices, it silently but none the less surely prevents reductions that otherwise would have been effected.

The sale of gas is the vital point, for without the maintenance of sales, mere technical improvements will not pay the dividends. The Board of Trade returns for 1913 are, of course, not yet complete, but those of 1912, as compared with the preceding year, showed an increased quantity of gas sold to the extent of 6,212 million cubic feet. For some years the advance has been chiefly due to slot users, but this year there is a marked advance in the ordinary class also, for which the British Commercial Gas Association may claim some share of the credit. A central association cannot entirely fill the place of proper local effort, but it can systematize, assist, and bring spasmodic, irregular attempts into regular order, a lack of which leads to a lot of labor going in a wrong and unprofitable direction. All canvassing efforts, if they are to have a permanent and lasting effect, must be carried out with much tact, judgment and knowledge of the people being dealt with. It is no use to place appliances that are too costly, too large, or otherwise unsuited to the wants of the user. And it is no use pushing business and thinking to be able to follow along with any necessary enlargements of manufacturing, purifying and distributing plant. A few short supplies will sadly discount missionary effort, and it is not much use to tell people that the present shortage is unavoidable, but that it will be all right in the course of 3 or 6 months. Most of the new business, and probably some of the old, will be drifted off in other directions before the expiration of the probationary period. The benefits following the National Gas Exhibition will not be in time to have any marked effect on the sales of 1913, but there is already evidence that they have reached a class it is difficult to get at in other ways. I allude to the doctors, clergy, and the well-to-do professional class in general. Gas also continues to do more than hold its own in the matter of public lighting, several important installations having been put down during the year.

There has been, and still is, a marked tendency to the extension of gas supply areas, not only by taking in outlying villages or small townships at 5, 6 or 7 miles from the source of supply, but by amalgamations of two or more adjacent undertakings, and the concentration of the manufacture on one spot. Several reasons have stimulated the movement in this direction, apart from the obvious saving secured by one set of directors and administrative staff doing the work of two or three, or to natural advantages, such as a clear water board or other facilities for transit of materials inward and products outward. Sometimes a difficulty arises about doubling or trebling the size of a gas works. The question of nuisance is raised by owners of adjoining property, or there is a difficulty about additional land Gas companies are assured by their neighbors that they depreciate value of the property, yet, strange to say, the depreciation is not evident when they want to extend their borders by buying adjacent land. But, thanks to the modern vertical retort, it is now practicable to make two or three times as much gas on the same ground not only without increasing the nuisance, but with an absolute cessation of it, so far as the retort house is concerned. It is now practicable to conduct carbonizing operations without soot, smoke, dust, steam or objectionable smells, and with a great economy of labor. As much will be evident if we visit a recent installation of vertical retorts and find three men, with countenances and clothing of the original natural color, turning out half a million cubic feet of gas per 24 hours, in a building as clean and fresh as when the constructors left it a few months ago. Borrowing a leather glove the visitor can pull the levers and deliver a charge of coal, or let out a charge of coke, without detriment to his hands or his clothing. Contrast this compact and clean plant, probably standing on an area of 60 feet by 40 feet, with an ordinary retort house containing 12 beds of 8's. If in one row, the area occupied will be more than double, and if set back to back, there is not much saving, because there must be a working floor each side. And in this case we find a gang of 4 or 5 men engaged in charging coal or wheeling out coke to the accompaniment of much grease, sweat, clatter, soot, smoke, escaping gas, and steam, and with much wear-and-tear of barrows, scoops, and rakes. But the vertical retorts are rather costly in the first place, and therefore only applicable on a large scale. In small country districts it may need a joining up of two or more undertakings to make them practicable. There can be no question but that a prominent feature of 1913 is the increased use of vertical retorts.

Then there is the introduction of coated steel main pipes, whereby both the first cost, and upkeep, of long runs of trunk mains are largely reduced. The prejudice as to their durability, at one time very prevalent, has now almost entirely disappeared. It is strange that engineers who have been continually laying wrought iron service pipe up to 2½ or 3 inches diameter, should have had such a strong feeling against larger sizes. Whether a pipe is a service or a main is (as a recent legal decision has shown) a complicated legal question, but the leakage will be the same in either case. And why should a 6-inch or 8-inch pipe corrode more rapidly than a 2-inch? I laid my first steel main 15 years ago, and it has continued in satisfactory use to the present day. There is no reason why it should not last 50 years or more. Recently a length of 8-inch steel main, covered with tarred jute, that was laid 5 years ago in soft marshy ground, was uncovered. The soil was made ground, consisting largely of household ashes and garbage, the site having been used as a pitch for the city refuse carts, the object being to get a building level well above the water line. And the exterior of the pipes is waterlogged for at least 6 months in the year. But the jute forms a perfect protection, and the metal of the pipe is as good as new. To be consistent, engineers who object to steel main pipe should use cast iron service pipe. In a sense the war is now carried into the other camp, because steel pipe coated with jute is now being supplied in sizes down to ¾-inch diameter, and in lengths up to 35 feet, is more handy, besides being lighter than wrought iron screwed pipe. In damp or acid soils it would certainly be worth while to consider the advisability of using coated pipe, whether steel or wrought iron, for all sizes. Now steel tube is available up to 24 inches diameter, and saving in manufacturing and other costs as above indicated will more than outset additional costs of distribution over an enlarged area.

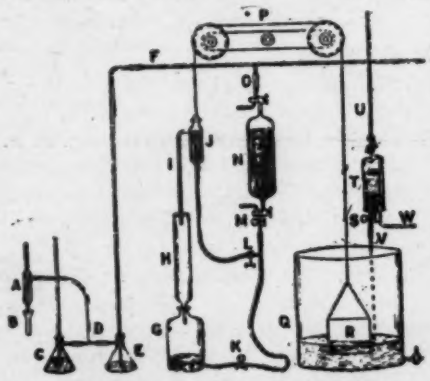
The tendency towards a gas more suited to the requirements of the atmospheric type of burner, than to the open flat flame, has been continued, and if this movement is slow, it is sure. Every year sees a reduction in the proportion of open flat flame burners in use. All new consumers, with very few exceptions, go solid for incandescent lighting; in fact, the advantages afforded by that system are the principal attraction. Consequently, there is no reason why the 90 or 95 per cent., as represented by the various types of the atmospheric burner, should be neglected in favor of the small remainder represented by the flat flames. When these constituted practically the whole of the lighting consumption of course the case was on a differ-

ent footing, and Parliament very wisely prescribed a 16-candle gas. But now, nearly all applications to Parliament on behalf of new companies specify 14 candles, or less. Some ask 13, or even 12. This lower quality gas is quite as good, so far as the 95 per cent. are concerned, as the old fashioned 16-candle. In some respects it is better, as giving a smaller and a hotter flame, more adapted to the requirements of the incandescent mantle. It can be manufactured at a substantial reduction as regards working expenses. The way is thus being prepared for the replacement of the photometer by the calorimeter as the standard test. Many gas engineers have for years paid more attention to the heating than to the lighting value, especially in districts where they are not trammelled by grandmotherly legislation, of the red tape kind, and the result of such a policy is a marked decrease of complaint, and a high sale of gas per head of the population; which is really the end we are all seeking to reach, some in one way, some in another.

New Methods and Appliances.

AUTOMATIC SAMPLING OF GASES.—Mr. Thomas Gray contributed a paper on this subject to the Scotish Section of the Society of Chemical Industry. Referring to the difficulty of securing a representative sample over a prolonged period, he says that if mercury be used as the confining liquid the alteration of pressure, caused by the falling level, necessitates constant attention to the adjustment of the rate of flow to secure even approximately uniform sampling, and this regulation is generally not sufficiently accurate to ensure good results. If concentrated aqueous solutions of glycerine or of magnesium chloride are used this difficulty is less pronounced, but a new error is introduced—the solvent power of these solutions on the gas sampled, particularly if the gas contains a large proportion of carbon dioxide. Mercury is the better confining liquid, if a small quantity can be used in such a way as to ensure a representative sample of the gas over any specified period. With this object in view he designed the apparatus illustrated.

It consists of gas sampling tube, *N*, which may be filled with mercury from the bottle, *G*, attached to a reservoir, *J*, which is counterpoised by a vessel, *R*, floating in water in a tank, *Q*, the float connected with *J* by a cord over the pulleys, *P*. The height of the tank must be greater than the length of the sampling tube, *N;* the overflow tube, *I*, should be slightly longer than *N;* and the length of the wider tube, *H*, which merely serves to prevent loss of mercury by splashing, should slightly exceed that of *I*. The jet, *V*, under pressure regulated by adjustment of the overflow, *W*, through which the excess of water from *U* escapes, delivers sufficient water during the specified period to raise the level in the tank to a height equal to the length of the sampling tube. As the water level rises, the reservoir, *J*, is steadily lowered, drawing the gas into the sampling tube, and the mercury, thus displaced, escapes through the overflow tube, *I*, to the bottle, *G*. By a suction pump, *A*, discharging into the drainpipe, *B*, a rapid current of gas is drawn along the tube, *F*, which is connected to the flue or gas main, a suitable filter being interposed to retain any solid particles. The connection, *O*, between the sampler and the tube, *F*, is preferably capillary tubing from 3 to 4 inches long, to prevent the diffusion of gas backwards from *N* to *F*. If desired, a small non-return mercury valve may be inserted at this point. The flasks, *C* and *E*, serve to indicate that the gas is passing freely along the tube, *F*, and at the same time act as a safety valve; as long as the tube, *F*, remains clear the gas passes through *E*, but if obstructed, air is drawn through the bottle, *C*, thus preventing the pump from drawing the mercury out of the sampling tube.



To start the apparatus, the tube, *F*, is connected with the gas supply and gas drawn through *F* by the filter pump. The rubber tube, connecting the jet, *V*, with the water supply, is then closed by the clip, *S*, and water is allowed to run into *T* and overflow through *W*, the height of which has previously been adjusted to the desired level. Water is now run from the tank, *Q*, till the top of the overflow tube, *I*, is at the level of the shoulder of the gas tube, *N*—it is desirable to use sampling tubes with square elbows—and *J* and *N* are now filled with mercury by raising the bottle, *G*, after which the clip, *K*, is closed and the bottle is replaced in the position shown. The capillary, *O*, is finally filled with mercury by raising the reservoir, *J*, the lower stop-cock of the sampling tube is closed, and *J* is then lowered to its former position. The sampling tube and the capillary, *O*, are, at this stage, completely filled with mercury; *J* is filled to the overflow tube, which is level with the point where the capillary joins the shoulder of the gas tube, *N*. The operation of sampling may now be commenced by opening the lower stop cock of the gas tube, and starting the flow of water from the jet by slipping the clip, *S*, up in the glass tube into the position shown in the sketch. The suction pump and the water supply to *T* remain in operation during the whole period, and the apparatus requires no further attention.

The period of sampling may be varied in a number of ways:

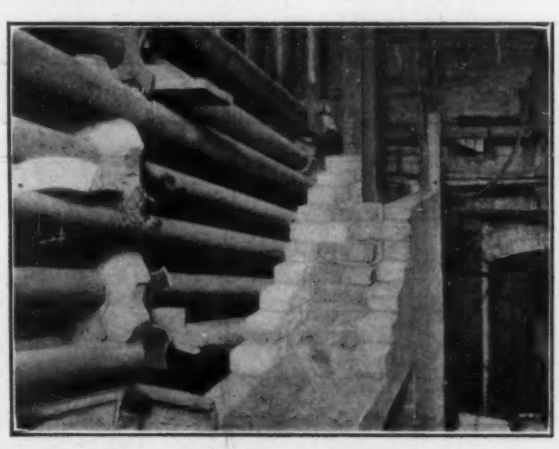
(1) Jets may be constructed to deliver the requisite quantity of water in the specified times; these are easily drawn from glass tubing in a blow-pipe flame, the final adjustment being effected by altering the head of water in *T*.

(2) Tanks of various diameters may be employed.

(3) The height of the sampling tube, *N*, may be varied.

(4) Two or more sampling tubes may be attached at different points to the tube, *F*, and, by means of T-tubes, to *J* and *G*, these being used in rotation.

INSULATING BRICK FOR FURNACES.—The Armstrong Cork Company of Pittsburgh, Pa., in addition to their line of cork specialities and sectional steam pipe coverings, have brought out an insulating brick for use in boiler settings, furnaces, stacks, kilns, etc. The brick is composed of a mixture of infusorial earth, a small quantity of clay and finely ground cork, the latter ingredient being burned out in the firing. The bricks are 2½ by 4 by 9 inches, weigh about 1½ pounds, and are sufficiently strong to be laid-up with fire brick or common red brick. Their conductivity is remarkably low, being approximately 12 B.T.U.'s per square foot, per degree of difference in temperature, for 1 inch thickness, in 24 hours; or about $\frac{1}{10}$ the conductivity of ordinary brick.



The cut shows how the insulating brick can be laid as a backing to a fire brick lining, and bonded to both the fire brick and the common brick skin.

U. G. I.'S WAY OF CHANGING A COAL HEATED CANDY STOVE TO GAS.—Any candy stove can be easily changed to burn gas. When you burn coal you waste heat up the chimney to make the draft to keep the fire going. When you convert the stove to gas do not leave the flue pipe like Fig. 2, it is useless and wasteful. Fig. 1 shows the right

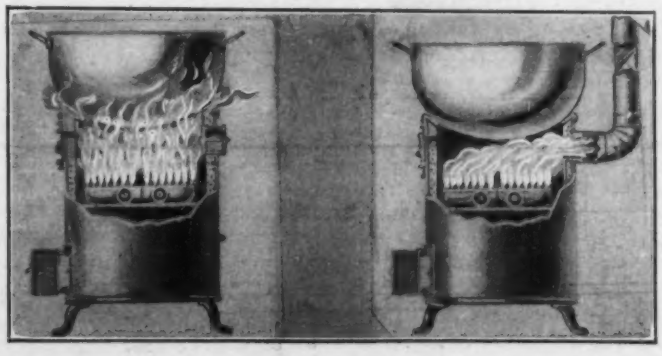


Fig. 1.—Right Way. Fig. 2.—Wrong Way.

way to install the gas burner. The flue pipe is taken down and the outlet capped, and the kettle, instead of resting directly on the ring, is raised about ¼ inch by some small pieces of iron, leaving an opening under the pot. No heat is lost up the flue and all the flame strikes the bottom and sides of the pot. Here are some actual figures of gas consumption in candy making:

Hard candy is any "cook" above 318°, such as sticky candy, taffy, brittle and gloss goods, etc. Soft candy, any "cook" up to 245°, creams, caramels, jap work, etc.

Kind of Candy.	Batch Pounds.	Final Temp.	Time, Min.	Gas Cost in Cents— Per Batch.	Per Pound.
Hard straws....	42	340° F.	26	8½ c.	¼ c.
Soft jap work...	110	242° F.	42	13½ c.	⅛ c.
Peanut brittle...	26	320° F.	14	4½ c.	¼ c.
Fudge.....	65	258° F.	18	5½ c.	1/11 c.

Recent Patent Issues.

Prepared for the American Gas Light Journal by Royal E. Burnham, solicitor of patents and counselor in patent causes, 833 Bond Building, Washington, D. C., from whom illustrations and specifications of any patent mentioned below may be obtained for 20 cents.

1,083,468. Method of Producing Gaseous Fuel. A. W. Southey Edgware, London, England.

1,083,507. Gas Producer. E. Ragot, Bettaincourt, and P. Pierre. Hervotte, Joinville, Haute-Marne, France.

1,083,683. Process of Producing Gas. J. H. Hirt, El Paso, Tex., assignor, by mesne assignments, to Allis-Chalmers Mfg. Co.

1,083,885. Gas Washing and Cooling Apparatus. E. F. Lloyd, Detroit, Mich.

1,083,936. Incandescent Gas Lighting. R. Langhans, Berlin, Germany.

1,083,988. Process of Separation of the Constituents of Gaseous Mixtures. G. Claude, Paris, France, assignor to Societe l'Air Liquide (Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude), same place.

1,084,241. Illuminating Lamp. N. J. Verret, Memphis, Tenn.

1,084,425. Safety Gas Valve. L. F. Hager, Dayton, O.

1,084,472. Mixer-Cap for Gas-Range Burners. H. P. G. Norstrand, Albany, N. Y., assignor to Rathbone, Sard & Co., same place.

Items of Interest
FROM VARIOUS LOCALITIES.

Mr. T. J. Potter, for quite a while the New England representative of the William M. Crane Company, of New York, has been appointed the Company's Sales' Manager, and Mr. Frank D. Cadwallader, formerly Commercial Manager, the Lowell (Mass.) Gas Light Company, has been appointed to succeed Mr. Potter in the Crane Company's New England field.

A novel proceeding in defending a damage claim is reported from Fort Smith, Ark. Some weeks ago an infant son of one H. M. Coppage, a resident of Fort Smith, died (as alleged) from the effects of inhaling natural gas, that escaped from leaky pipes, and Coppage sued the Fort Smith Gas Company for damages amounting to $45,000. The Company's defense was that the child died from inhaling fumes from the gas, such fumes having been caused by gas that was improperly consumed. During the progress of the trial the Company induced 7 persons to remain for 5 hours in an apartment, the air of which was contaminated by the admission thereto of 40 cubic feet of natural gas each hour of the 5. When the persons were released it is declared none showed any symptoms of injury from their experience in the gas charged apartment.

The Everett (Wash.) Gas Company has entered into a 2-year contract (1914-15) to supply the Sumner Iron Works plant with gas for fuel use in some of its departments. It is estimated that the consumption will average 250,000 cubic feet each month.

Messrs. Grainger & Co., operators of a structural steel plant in Louisville, Ky., have shut down the steam power for 3 engines, and have contracted with the Louisville Gas and Electric Company for fuel for their entire power requirement, equalling 400-horse.

Inordinate labor demands have received a forceful setback in the outcome of the strike at Leeds, England. All public works (gas and electric, lamplighting and street car operating), of Leeds are under municipal operation, and, on December 23d, all the works' hands struck, through a refusal of their claim for higher wages. When the strike was on the citizens, many of whom were engaged in the higher professions, set to with a will, and kept the public necessities going fairly well. On the 13th of January the men surrendered, declaring their willingness to resume work under the old conditions provided the Council reinstated all who went out. This the Council refused to do, whereupon the men gave up the struggle, and 60 per cent. or so of the malcontents were re-employed, the others to be taken on as opportunity presented.

The Irondale (O.) Gas Company has been incorporated by Messrs. J. S. Paisley, Sam. Ungerleider, T. W. Vance, N. M. Paisley and F. E. Vance. The initial capitalization is $20,000. Irondale is a post village of Jefferson County, O., and is on the Pennsylvania Railroad at a point 37 miles south-southeast of Alliance. It is 3 miles in from the Ohio river, and has extensive manufactures of sewer pipe and firebrick. Coal and iron ore are found in paying quantities there, and it maintains two prosperous banks. Its population is close to 3,500, and while it is a busy place, the nature of the population is such as to preclude the idea that an artificial gas proposition would prove a profitable enterprise for some time. There is good hope though for the disposal in Irondale of individual producer gas plants.

The sendout of the Mohawk (N. Y.) Gas Company, on its Schenectady district, for the 13th January, reached the imposing total of 1,334,500 cubic feet. When the Schenectady plant proper was controlled by the late Capt. Wm. Henry White and associates, say 15 years ago, the named output would have seemed large were it credited to the term of a week. Further evidences of "decay" in the industry? Well; say!

At the annual meeting of the Hartford City (Conn.) Gas Light Company the following result was reached: Directors, Geo. Bullock, S. R. Bertron, E. B. Bennett, J. H. Knight, Geo. Roberts, J. T. Robinson, F. R. Cooley, J. R. Hills and S. C. Dunham; President, E. B. Bennett; Vice-President, G. H. Bullock; Secretary and Treasurer, J. A. McArthur; Assistant Secretary, J. T. Robinson; Assistant Treasurer, W. A. Kneeland; General Manager, B. W. Perkins.

Mr. Jno. S. M. Wharton, Manager, the Peoples' Lighting, Heating and Power Company, Barre, Vt., will retire from that service the 15th inst., to become part owner and active manager of the Central Flatiron Mfg. Company, Binghamton, N. Y., the various irons of which concern are well and favorably known to the gas men. In fact, we believe the Binghamton factory is the largest in the world, devoted exclusively to gas irons output. Mr. Wharton will also become Assistant Manager and part owner in McKinney and Company, also of Binghamton. Having graduated from Lehigh University, he became connected with the Winchester Repeating Arms Company, of New Haven, Conn., and after awhile he joined the forces of the U. G. I. Company. After several years' varied work with that corporation, he was transferred to Barre, where he assumed the place of Manager of the Peoples' Lighting, Heating and Power Company, taking up the duties thereof July 1, 1912, and the named corporation has been greatly bettered by his shrewd, competent management of its affairs. His successor at Barre has not been announced.

At the annual meeting, Central Hudson Gas and Electric Company, held the third Tuesday in January, these results were reached: Directors, T. R. Beal, G. A. Voorhees, H. S. Reynold, A. R. Beal, F. N. Bain, J. L. Wilkie, H. M. Beugler, R. A. Davidson and E. E. Perkins; President, T. R. Beal; Vice-President, J. L. Wilkie; Treasurer, Wm. Shickle; Secretary, P. A. Burns.

There is a resident of Chicago, named Fred. C. Herbst, who is frequently posing in the daily press as "The Friend of the People." Of course, the said Herbst never can find an instance in which the public utility concerns of Chicago are conforming to their duties, obligations, etc.; and, as might be expected, he is particularly peeved over the laxity of the Peoples Gas Light and Coke Company in the

said respects. These statements, of course, reflected largely upon the competency or honesty of the Inspector (W. D. Wilcox) of Gas and Gas Meters; of the Chief Gas Tester (P. E. Haynes); and of the Commissioner (Ray Palmer) of Gas and Electricity. Keeping up his tirade, the three named officials got up a rescript average of their tests made in the 3 preceding years, and forwarded the same to the *Tribune*, which paper published the figures in full. The averages for January, February, October, November and December in 1911, 1912, 1913, are given:

Month.	Year. 1911.	1912.	1913.
January	24.3	23.9	23.8
February	24.7	22.9	23.2
October	24.8	23.0	23.9
November	24.5	23.9	22.9
December	23.9	23.7	22.3

The requirement respecting candle power is 22. The average heat unit value (requirement 600) was thus returned: 1911, average 632; 1912, 621; 1913, 628. And there you are.

AT the annual meeting of the Omaha (Neb.) Gas Company the only change made in the Directorate was the naming of Mr. W. T. Douthirt in place of Samuel T. Bodine. Mr. Frank T. Hamilton was re-elected President, and Mr. G. W. Clabaugh also succeeded himself in the Vice-Presidency.

MANAGER JOHN J. KIRKPATRICK, of the Holyoke (Mass.) Municipal Gas and Electric Department, in his estimates for the coming year, on gas plant account, recommends the installing of a coke conveying, storing, crushing and sorting apparatus and the placing of an ammoniacal concentrating plant.

MR. KIRKPATRICK also announces an increase in gas output amounting to 7.09 per cent.; the placing of 765 additional gas meters—these now total 13,098; additional services set, 186; miles of additional main, 2 4. It is also worthy of note that the 6 benches of verticals, on the Woodall-Duckham plan, constructed and erected by the Isbell-Porter Company, over a guarantee to produce 750,000 cubic feet in 24 hours, were started up November 4th under the direction of the contractors, and the results therefrom have been eminently successful.

THE Public Service Commissioner (T. M. Scarborough) of Houston, Tex., has ordered that gauges to determine the pressure of gas supplied shall be placed in all the fire engine stations; further, he is under the impression that "a different sort of gauge, or one up to revealing the illuminating power at a glance," should also be "hung up." Pessimi exempli!

THAT great center of liberality, yclept Indianapolis, Ind., having achieved the distinction of securing that which virtually is the lowest artificial gas rate charged by any artificial central gas station in America (55 cents per 1,000 cubic feet) is up in arms over the provision which permits the Citizens Gas Company to make a deficiency charge of 5 cents per 1,000 on all accounts not settled in 10 days from their respective datings. In fact, the Federation of Civic Associations (how we apples float!) has taken the matter up with a view of appealing to the courts for redress—redress, mind you!

"B. L. R.," writing from Louisville, Ky., under date of the 20th, informs us that, at a meeting of the Board, suitable resolutions respecting the memory of the late Col. John H. Whallen were adopted. A brother of deceased (Col. Jas. P. Whallen) was elected to the vacancy on the Board. The resignation of Mr. D. E. Doherty (on account of failing health) was also accepted.

"MR. JAMES E. BARKER, gas and power engineer, the Board of Public Utilities, California, recently filed with that body his recommendations as to the rates that should be fixed for natural gas; also, for the mixed product down to July 1. Before Mr. O. O. McReynolds was removed from the Board, that gentleman, in concert with other engineers, declared that the natural gas rate, if fixed at the present time, would have to be between 60 and 65 cents per 1,000 cubic feet of gas. It is thought that Mr. Barker's figures are close to these. The rates that he recommends will probably be approved by the Board. I might further add that gas matters in this beautiful place are really on the boom.—ALT."

"L. F. L.," is informed that the J. B. McCreary Engineering Company, of Atlanta, Ga., has in hand the matter of preparing plans and specifications for the gas plant to be erected this spring, in St. Petersburg, Fla., for operation on municipal account. It might be further said that Commissioner C. D. Hammond, of St. Petersburg, is authority for the statement that the plant will be in readiness to operate on or before August 20th.

"BRUCE," writing from Fremont, Neb., under date of the 22d January, says: "Mr. L. A. Ramsay, for some time Manager, the New Business Department, the Fremont Gas, Electric Light & Power Company, has been transferred to the bookkeeping division; Mr. Kent Graham has been moved up from stock clerk to the new business division, and Mr. Huston Cobble (a graduate of our local High School) takes up the former tasks entrusted to Mr. Graham."

THE Albany (N. Y.) *Argus* notes that, at an adjourned meeting of the Joint Committee on Calorimetry of the New York Public Service Commission and representatives of the gas companies of the district affected, Mr. Walter R. Addicks, First Vice-President, the Consolidated Gas Company, Chairman, of the Committee, having read from the report items concerning the main points involved, declared that the object in mind of the Committee was the selecting of a standard to enable the consumer to get the greatest value for the least expenditure and to enable the Companies to earn a profit at the least expense to the consumer. In his argument, which was a splendid example of coherent logic, expressed in forceful, correct manner, he also noted the fact that, in New York city at least, the residents were not slow to learn that the mantle lamp had it all over the open flame vehicle, both in respect of illuminative yield and a lesser consumption of gas. Mr. Addicks, too (and without any begging the question) called attention to the fact that something should be done to prevent unscrupulous dealers, who unfortunately are many, from selling, under certain very untruthful representations, mantles of a type so inferior as to be utterly worthless.

LATE last month the offices, Commonwealth Power Company and of the Jackson (Mich.) Gas Company were consolidated, and Mr. B. R. Larraway, Manager of the Jackson Gas Company, will act as Manager of both Companies, in so far as their relations affect Jackson.

AT the annual meeting, the Ludington (Mich.) Gas Company, these officers were re-elected: President, C. N. Remington; Vice-President, Andrew Fyfe; Secretary, Chas. A. Coye; Treasurer, H. L. Adsit. The Company's earnings during the year were increased to the point showing a balance equal to 2 on the common. The Company will expend quite a sum this season on betterments, likely the bulk of which will go to main extensions.

MR. JOHN S. KENNEDY, well known to the gas men of this State, from his excellent work with the Public Service Commission, Second (Albany) District, has been appointed Secretary to the Employees' Benefit Fund Committee, the New York Telephone, Bell (Pa.) Telephone and Chesapeake and Potomac Telephone and associated Companies. His offices will be in the Bell telephone headquarters, 15 Dey street, city.

THE annual meeting, the W. E. Moss Company, which concern controls the plants in Fulton, N. Y.; Grand Haven, Monroe, Coldwater and Hillsboro, Mich.; Columbus, Ind.; Winston-Salem, N. C., and Hannibal, Mo., will be held in Hannibal, the 14th inst. The meeting is to discuss ways and means of bettering business, and to interchange useful experiences. That the social side will be well taken care of is assured when it is known that that prince of good fellows (Mr. F. A. Tippy, local Manager at Hannibal) is in charge of arrangements on such account.

AT the shareholders' meeting, the Galveston (Tex.) Gas Company, these Directors were elected: Henry J. Runge, John R Sealy, John C. Walker, R. Waverley Smith and Sealy Hutchings. The Directors will organize the Board at a meeting to be held the 11th inst.

A GROUP of corporation representatives met towards the close of January, in the Colonnade Hotel, Philadelphia, to organize the Philadelphia branch, National Council for Industrial Safety, which organization, as many of our readers know, is projected to conduct a nation-wide campaign for the prevention of accidents in industrial establishments. Mr. J. B. Douglas, Claim Agent, the U. G. I. Company, was chosen Chairman, and Mr. E. J. Speh, of the Bell Telephone Company, was elected Secretary. Mr. Samuel T. Bodine consented to act as an Honorary Vice-President. The follow-up meeting is down for the 3d inst.

The Market FOR GAS SECURITIES.

The betterment in Consolidated kept on well last week, the quotations going to 138¼; but realizing sales, coupled with failure of the annual report (the meeting was held last Thursday) to show a marked increase in surplus, the figure softened to 135½ to 135¾, which was the opening quotation to-day, Friday. The volume of recorded sales was greater than that reported for some months.

The annual report was, as usual, full of interest, but also, as usual, its wording is a triumph in respect of merely revealing great concretes, without particular analysis of quantities. Nevertheless, this great corporation's earnings amounted to a return equal to 7¼ per cent. on its $100,000,000 capital. The surplus was increased by $1,246,959—$289,740 less than the preceding year, the total of which now stands at $15,031,540. The total income amounted to $8,123,805, or an increase of $118,681, the increase being brought about by better returns on certain investments. The net would have been considerably greater were it not for a considerable cut in the dividend on Mutual shares owned by it.

The total sales of gas accounted for the tremendous output of 29,262,457,670; but this total amounted only to an increase of .39 per cent. for the year. The sales of electric current (excluding that furnished on account of the Third Avenue Railroad contract) reached the equivalent of 441,237,534 k.w. hours, or a gain of 10.09 per cent. The Company had in use, as of December 31, gas meters numbering 904,303, and electrics numbering 262,026.

Taxes, on all account, called for the payment of $3,965,087.56; additions to and extentions of the general plants absorbed $12,839,532.81; and repairs and renewals took up $7,052,187.89.

In respect to street lighting it is noted that the municipal street lamps on the lines of the gas and electric distribution system number: Incandescent gas, 25,597; open flames, 96; electric arcs, 12,428; electric incandescent, 21,599; a total of 59,860.

The report also carries other most interesting information, a broad resume of which will appear next week. The retiring Board of Directors was re-elected, and the executive organization will be perfected the 24th inst.

Quotations for Brooklyn Union are up a point, with a decided tendency on the part of holders to ask higher prices. We have not the slightest hesitation in saying that Brooklyn Union will readily sell at 140 prior to September first. The Company is now fully realizing the benefit of the betterments in its distributing division, and of its modern method as applied to its commercial division. Mr. Ambler's just ways are bearing fine fruit in respect of unifying the Company's Commercial forces.

Peoples, of Chicago, is somewhat less firmly held, the result largely of realizing sales. The sellers will likely have a chance to buy back in a fortnight or so at much higher than current figures.

Lacledes are still below par in the bid (97½), although some inquiry exists for the common on investment account, which is not to be wondered at, considering its nominal value on the Exchange.

There is little doubt that this spring positive action in respect of consolidating the Washington and Georgetown (D. C.) Companies will be taken. In fact, conferences as to how best to secure the legislation needed are reported. On the whole, it would be good business for both concerns if the merger did take place.

Some bargain hunters managed to get in well at a recent sale of Newport (R. I.) stock. Three lots, of 10 shares each, were sold at auction, at 162½ to 160. If this stock is not worth 200, it is not worth anything. Its standing in all respects never was better.

To-morrow the shareholders will formally authorize an issuance of $115,000 (par) new stock in the Fall River (Mass.) Company, the Board of Gas and Electric Light Commissioners having fixed on an upset of $225 for each $100 share. The bond market continues very active.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

115 BROADWAY, NEW YORK CITY.

FEBRUARY 2.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share:

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked*
Consolidated Gas Co.	$99,816,500	100	135½	135¾
Central Union Gas Co.—				
1st 5's, due 1927, J. & J.	8,500,000	1,000	101	102
New Amsterdam Gas Co.—				
1st Con. 5's, due 1948, J. & J.	11,000,000	1,000	99	101
New York & Richmond Gas Co. (Staten Island)	1,500,000	100	59	62
1st Mtg. Gold Bds. 5 p. ct.	1,500,000	—	98½	100½
New York and East River—				
1st 5's, due 1944, J. & J.	3,500,000	1,000	103	105
Con. 5's, due 1945, J. & J.	1,500,000	—	96	100
Northern Union—				
1st 5's, due 1927, J. & J.	1,350,000	1,000	100	102
The Brooklyn Union	15,000,000	1,000	126	129
1st Con. 5's, due 1948, M. & N.	15,000,000	—	102	103
Yonkers	299,650	500	180	—
Out-of-Town Companies.				
Grand Rapids Gas Light Co., 1st Mtg. 5's	1,350,000	1,000	100	101
Hartford	750,000	25	190	200
Laclede Gas Co., St. Louis.	10,000,000	100	97½	100
Preferred	2,500,005	100	—	102½
Bonds	10,000,000	1,000	102½	103
Madison Gas and Electric Co. " 1st Mtg. 6's	400,000	1,000	106	
Massachusetts Gas Companies, of Boston	25,000,000	100	93	93½
Preferred	25,000,000	100	93	94
Montreal L. H.& P., Canada	3,000,000	100	219½	220
Peoples Gas Lt. & Coke Co., Chicago	25,000,000	100	122	122½
1st Mortgage	20,100,000	1,000	103	103½
2d "	2,500,000	1,000	104	—
Pacific Gas and Electric Co.	15,500,000	—	43	44
St. Paul Gas Light Co.	2,500,000	100	—	—
1st Mortgages, 6's	650,000	1,000	104	105
Extension, 6's	600,000	1,000	112½	115
General Mortgage, 5's	3,447,000	1,000	94	96
United Gas Imp. Co.	55,502,950	50	171	172
Washington (D. C.) Gas Co.	1,000,000	200	440	442

MEETING TIMES OF THE VARIOUS GAS ASSOCIATIONS.

Alabama Light and Traction Company.—Annual meeting, May ——1914. Officers, President, R. L. Ellis, Selma; Treasurer and Secretary, H. O. Hanson, Mobile.

American Gas Institute.—Annual meeting, New York, October 21, 23, 1914. Officers: President, W. H. Gartley, Philadelphia. Secretary, Geo. G. Ramsdell, 29 West 39th st., N. Y. City.

Canadian Gas Association.—Annual meeting————1914. Officers: President, A. A. Dion, Ottawa; Secretary and Treasurer, John Keilior, Hamilton, Ont.

Empire State Gas and Electric Association.—Annual meeting, New York City, Oct. 1914. Officers: President, J. T. Hutchings, Rochester, N. Y.; Secretary, C. H. B Chapin, 29 W. 39th street, New York City.

Gas Meters.—Monthly Section Meetings; Grand Commissioner, Will. W. Barnes, East Orange, N. J.; Gen'l Sec'y, H. Thurston Owens, La Crosse, Wis.; New York Section, Chairman, W. H. Pettes; Secretary, G. E. Smith, Sipp Avenue, Jersey City, N. J. Philadelphia Section; Chairman, Stanley Grady; Secretary, H. E. Stiteler, Broad and Arch streets. Cleveland Section, Chairman, F. R. Hutchinson; Secretary, Wm. Holtz, East Ohio Gas Co. New England Section, Chairman, T. W. Jennings, Boston; Sec., F. K. Wells, 69 Broad street, Boston. Winona Section, Winona, Minn., W. F. Clausen, Chairman. Bethlehem Section, Trueman Weithnecht, Chairman; Sec.-Treas., Truman Buss, South Bethlehem, Pa. Wisconsin Section, C. H. Wiggers, Chairman; A. A. Ott Secretary, Milwaukee, Wis.

Guild of Gas Managers of New England.—Annual meeting, March, 1914. Young's Hotel, Boston; monthly meeting, second Saturday. Officers: President, Walter G. Africa, Manchester, N. H.; Secretary, H. K. Morrison, Brockton, Mass.

Illinois Gas Association.—Annual meeting, March 18th and 19th, 1914. Chicago, Ills. Officers: President, W. F. Barrett, Chicago, Ills.; Secretary-Treasurer, Horace H. Clark, 115 No. Oak Park avenue, Oak Park, Ills.

Illuminating Engineering Society.—Annual meeting, Cleveland, O., September, 1914. Meetings of Sections, monthly. Pres., Charles O. Bond; General Secretary, J. D. Israel, 1009 Chestnut st., Philadelphia, Pa. Sections: New York, Secretary, C. L. Law, 124 West 43d street. New England, Secretary, C. M. Cole, 166 Pearl street, Boston, Mass. Philadelphia, Secretary, L. B. Eichengreen, Counties Gas & Elec. Co., Ardmore, Pa. Secretary, J. B. Jackson, 28 North Market street. Pittsburgh, Secretary, Alan Bright, 827 Wabash Bldg., Pittsburgh, Pa.

Indiana Gas Association.—Annual meeting, March 11 and 12, 1914. Terre Haute. Officers: President, A. S. Cooke, Terre Haute; Vice-President, A. C. Blinn, Evansville; Secretary-Treasurer, Philmer Eves, Indianapolis.

Institution of Gas Engineers.—Annual Meeting, Liverpool, England, June 16. President, Edward Allen; Secretary, W. T. Dunn.

Iowa District Gas Association.—Annual meeting, Davenport, May 27, 28, 29, 1914 Officers: President, B. C. Adams, Lincoln, Neb.; Secretary, G. I. Vincent, Des Moines, Ia.

Kansas Gas, Water and Electric Light Association.—Annual meeting, October—— 1914. Arkansas City. Officers: President, Al. Newman, Arkansas City; Secretary and Treasurer, Ivan Thomas, Wichita Kas.

Michigan Gas Association.—Annual meeting, September, 1914. Place, undetermined. Officers: President, H. W. Douglas, Ann Arbor, Mich; Secretary-Treasurer, Glenn R. Chamberlain, Grand Rapids, Mich.

Missouri Electric Light, Gas, Water Works and Street Railway Association.—Annual meeting, April, 1914; Mexico, Mo. Officers: President, P. A. Bertrand, Joplin, Mo.; Secretary and Treasurer, P. W. Markham, Brookfield, Mo.

National Commercial Gas Association.—Annual meeting, Dec. ——1914, Minneapolis, Minn. Officers: President, P. S. Young, Newark, N. J.; Secretary, Louis Stotz, 29 West 39th street, New York City.

Natural Gas Association.—Annual meeting, St. Louis, Mo., May 19 and 20, 1914: Officers: President, E. L. Brundrett, Kansas City, Mo.; Secy-Treas., T. Clive Jones, Delaware, O.

New England Gas Association.—Annual meeting, February, 18th and 19th, 1914. Boston Officers: President, T. H. Hintze, Providence, R. I.; Secretary-Treasurer, N. W. Gifford, East Boston, Mass.

New Jersey State Gas Association.—Next Meeting, ——, 1914, Asbury Park N.J. President, C. F. Butcher, Freehold, N. J.; Sec'y-Treasurer, O. F. Potter, Newark, N. J.

Ohio Gas Association.—Annual meeting, February ——— 1914 Columbus, O.; President, John M. Garard, Columbus, O.; Secretary, L. B. Denning, Columbus, O.

Oklahoma Gas, Electric and Railway Association.—Annual meeting, Oklahoma City, May, ——1914. President, F. E. Bowman, Ada; Secretary-Treasurer, H. V. Boze, Oklahoma City.

Pacific Coast Gas Association.—Annual meeting, Long Beach, Cal., September ——— 1914. Officers: President, C. S Vance, Los Angeles, Cal.; Secretary-Treasurer, Henry Bostwick, 445 Sutter street, San Francisco, Cal.

Pennsylvania Gas Association.—Annual meeting, Allentown, Pa., April ———, 1914; Officers, President, J. A. Frick, Allentown, Pa.; secretary-Treasurer, W. O. Lamson, Jr., West Chester, Pa.

Society of Gas Lighting.—Annual meeting Dec., 11, 1913: monthly meetings, second Thursday. Place, New York City. Officers: President, Fred. S. Benson; Secretary, George G. Ramsdell, 29 West 39th street, New York city.

Southern Gas Association.—Annual meeting, Mobile, Ala., April 22, 23, 24, 1914. Officers: President, James Ferrier, Rome, Ga.; Secretary-Treasurer, E. D. Brewer, Atlanta, Ga.

Southwestern Electrical and Gas Association.—Annual meeting, May 22, 23 and 24, 1914, Galveston, Tex. Officers: President, G. H. Gifford, Fort Worth Tex.; Secretary-Treas., J. D. Walker, Dallas, Tex.

Wisconsin Gas Association.—Annual meeting, May 20, 21, 22, 23, 1914, Milwaukee, Wis. Officers: President, Ewald Haase, Milwaukee, Wis.; Secretary-Treasurer, Henry Harman, Milwaukee, Wis.